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J. R. SCHRAMM, Editor-in-Chief
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No. 1

AGRONOMY

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(See also in this issue Entries 136, 139, 179, 203, 210, 217, 285, 286, 301, 348, 409, 422, 482, 525, 664, 687, 698, 721, 762, 763, 766, 793, 815, 829, 836, 849, 852, 866, 878, 881, 888)

1. ANONYMOUS. Cycles in yield of crops. *Nature* 109: 261-262. 1922.—Editorial comment is made on publications by H. L. Moore and by Sir William Beveridge.—*O. A. Stevens.*

2. ANONYMOUS. El cultivo del arroz. [Rice culture.] *Rev. Soc. Rural Cordoba* [Argentina] 21: 5701-5709. 1921.—Rice culture is discussed including history, cultivation, varieties, and uses.—*John A. Stevenson.*

3. ANONYMOUS. El cultivo del lino. [Flax culture.] *Jalisco Rural* [Mexico] 4: 715-721. 5 fig. 1922.—The article recommends flax growing for Mexico and gives cultural directions.—*John A. Stevenson.*

4. ANONYMOUS. International potato conference. *Gard. Chron.* 70: 280-281. 1921.—In this conference, held at London, November 16, 17, and 18, the 1st session was devoted to breeding and selection. At subsequent sessions there were addresses on early history, industrial and commercial uses, degeneration, life history of wart disease organism, immunity, blight, and miscellaneous diseases of the potato. The papers and discussion are to be published in an official report. [See also *Bot. Absts.* 11, Entries 2849, 2853, 2889, 2899, 2916, 2920, 2922, 2923, 2960.]—*P. L. Ricker.*

5. ANONYMOUS. Main crop potatoes at Wisley 1921. *Jour. Roy. Hort. Soc.* 47: 90-94. 1922.—Eighty-five stocks of potatoes were grown. The awards of the committee are listed. A classified list of varieties with descriptions and notes is given.—*J. K. Shaw.*

6. ANONYMOUS. Phosphorsäuredüngung und Beschaffung. [Fertilizing with and securing phosphoric acid. *Mitteil. Deutsch. Landw. Ges.* 37: 395-402. 1922.—A discussion, led by GERLACH, is reported regarding the extent to which the use of phosphoric acid may be temporarily dispensed with and sources of supply.—*A. J. Pieters.*

7. ANONYMOUS. The 1920 wheat, oats and corn yields from soil experiment fields in Illinois. Illinois Agric. Exp. Sta. Circ. 246. 4 p. 1921.—The report covers results from a number of the University of Illinois soil experiment fields located in different parts of the state.—*Mary R. Burr.*

8. ANONYMOUS. Work of sugar experiment stations. Bundaberg field day. Australian Sugar Jour. 14: 140-141, 147-149. Fig. 2-5. 1922.—A brief description is given of the best of the varieties of sugar cane and of cane seedlings which are being tested at the farm. Shahjahanpur No. 10 is proving to be frost resistant. This Indian variety is thin in stalk but has been increasing in diameter since it has been growing in Queensland.—*C. Rumbold.*

9. ALMADA, PONCIANO R. El cultivo de la caña de azucar. [The cultivation of sugar cane.] Jalisco Rural [Mexico] 3: 281-284. 1920.—Popular.—*John A. Stevenson.*

10. ANDERSON, H. Aim and purpose of federal grain standards. Rept. Maryland Agric. Soc. 6: 240-242. 1921 [1922].—Federal grain standards have proved advantageous in marketing wheat. With definite standards, the prices paid to farmers are consistent with prices quoted at the nearest terminal markets. Certain tests perfected by the U. S. Department of Agriculture safeguard wheat shipments.—*A. Lee Schrader.*

11. AYRES, W. E. Cotton experiments 1921. Mississippi Agric. Exp. Sta. Circ. 42. 8 p., 2 fig. 1921.—The results of variety tests, spacing, and breeding are given with discussions on topping and time for thinning cotton.—*J. Fred O'Kelly.*

12. B[ARBER], C. A. The classification of sugar cane varieties. [Rev. of: EARLE, F. A. Sugar cane varieties of Porto Rico. II. Jour. Dept. Agric. Porto Rico 5*: 1921 (1922).] Internat. Sugar Jour. 24: 350-353. 1922.—The second review of this paper.—*C. Rumbold.*

13. B[ARBER], C. A. Recent work in cane agriculture. [Rev. of: Review of agricultural operations in India 1920-1921. Sugar cane. 9-14. Superintendent of Government Printing Calcutta, 1922.] Internat. Sugar Jour. 24: 361-362. 1922.—Promising results are being obtained with seedlings raised at the Coimbatore farm, especially those obtained by crossing thick canes with *Saccharum spontaneum*, a natural grass. Hybrids having the deep-rooting character of the wild grass and the sucrose content of the cane have proved suitable for North Bihar and parts of the Punjab. In the United Provinces M16 and J247 are suitable for intensive cultivation. In Bengal, Yellow Tanna proved good. In the Punjab, Saretha was best in the Canal Colonies and Bihar. Co205 headed the best at Gurdaspur farm. In Assam, Striped Mauritius, B147, B376, and J33a were distributed; of new varieties Co9 and D74 were the most promising. In the Central Provinces, Khari is replacing the local Katai and Kala and some of the Coimbatore seedlings are promising. In Burma, cane cultivation is increasing and the following varieties, introduced from Coimbatore, are successful:—Ashy Mauritius, B147, J247, and Gilman. In Mysore, seedling work is continuing, and 2 seedlings are mentioned as superior to Red Mauritius, which exceeds the output of the local cane, Pattapatti, by 25 per cent.—*C. Rumbold.*

14. BARTLETT, H. Farmers' experiment plots. Maize experiments, 1921-22. Western district. Agric. Gaz. New South Wales 33: 409-410. 1922.—Seed was sown in drills 6 feet apart with 3 grains every 3 feet in the drills. The highest yield of 35 bushels per acre was secured from Funk's Yellow Dent and the lowest yield, 17 bushels per acre, from North West Dent. The variety U. S. 133 had a stalk height of but 4 feet and yielded 34 bushels.—*L. R. Waldron.*

15. BASU, S. K. Green-manuring of broadcasted paddy in Orissa. Agric. Jour. India 16: 689-690. 1921.—Seeds of dhaincha (*Sesbania aculeata*) and paddy are sown together in the proportion by weight of 1 of dhaincha to 6 of paddy. A month or 6 weeks later the fields are

ploughed, the green manure crop (and most of the rice seedlings) being destroyed and buried and serving as manure for the surviving rice plants. Field trials showed an increase in yield of 290 pounds of paddy as a result of this method.—A. Howard.

16. BASU, S. K. The possibilities of rabi crops in Orissa. *Agric. Jour. India* 17: 92-94. 1922.—The frequent destruction by floods of the paddy crop over large areas in Orissa has led to experiments to find the best means of utilizing such areas during the succeeding cold weather. Good yields of wheat, barley, oats, gram, and peas were obtained.—A. Howard.

17. BAUR, C. Ist der Hafer mit sich selbst verträglich? [Should oats follow oats in crop rotation?] *Illustr. Landw. Zeitg.* 42: 115-116. 1922.—Experiments are reported which show that land planted in oats is unfavorable to oats for at least 3 years thereafter. As possible causes, "soil exhaustion," lack of calcium, toxic root excretions, and insect pests are discussed.—John W. Roberts.

18. BLAKELY, W. F. Another pest for wool-growers. *Agric. Gaz. New South Wales* 33: 447. 1922.—Attention is called to the recent introduction of *Cenchrus pauciflorus* into New South Wales.—L. R. Waldron.

19. BREAKWELL, E. The medics or burr trefoils. *Agric. Gaz. New South Wales* 33: 418-426. 2 fig. 1922.—An analytical key and descriptions are given of various species, including *Medicago lupulina*, *M. denticulata*, *M. minima*, *M. laciniata*, *M. maculata*, *M. truncatula*, *M. orbicularis*, *M. scutellata*, *M. reticulata*, and *M. tuberculata*. Three species of crow foot of economical value, *Erodium cypnorum*, *E. moschatum*, and *E. cicutarium*, are described.—L. R. Waldron.

20. BUE, T. S. Cotton varieties. *Georgia Agric. Exp. Sta. Bull.* 136. 10 p. 1920.—Twenty-five varieties of cotton (*Gossypium herbaceum*) were tested. Histories of these varieties are given as well as cultural directions for use under boll weevil conditions.—T. H. McHatton.

21. BURT, B. C., and R. S. FINLOW. Some preliminary experiments with jute in the United Provinces. *Agric. Jour. India* 16: 618-625. 1921.—Trials show that on suitably selected land marketable jute can be grown profitably on the low-lying areas near the Sarda and Gogra rivers. Successful introduction of the crop depends largely on whether local cultivators can be persuaded to pay sufficient attention to proper cultivation and to retting.—A. Howard.

22. BUSSE, W. Ertragssteigerung bei Flachs durch Klimawechsel. [Increased yield of flax by change of climate.] [Rev. of: Commerce report of the Netherlands Government 9: 782.] *Mitteil. Deutsch. Landw. Ges.* 37: 386. 1922.—Flax seed of Irish growth was sent to Holland, France and Canada; seed was produced and returned to Ireland. The yield from the foreign raised seed of Irish origin was better than that from Irish grown seed.—A. J. Pieters.

23. C[ANADIAN] S[OCIETY OF] T[ECHNICAL] A[GRICULTURISTS] COMMITTEE ON RESEARCH. Agricultural research in Canada. *Sci. Agric.* 3: 3-17. 1922.—A list is presented of possible problems, including 53 in agronomy, 62 in botany and plant pathology, and 15 in horticulture.—B. T. Dickson.

24. CHILDS, R. R. A cotton production program. *Georgia State Coll. Agric. Bull.* 229. 12 p., 3 fig. 1921.—General information and instructions are presented to the farmers of Georgia in an effort to overcome the low price of cotton and boll weevil injury; suggested rotations are given, varieties recommended, and plans outlined for poisoning and controlling the weevil.—T. H. McHatton.

25. CHILDS, R. R. **College No. 1 cotton.** Georgia State Coll. Agric. Bull. 226. 8 p., 3 fig. 1921.—College No. 1 cotton is a new early variety of big boll cotton (*Gossypium herbaceum* L.) developed at the Georgia State College of Agriculture to meet the demands in the fight against the boll weevil. The variety originated as a selection from Sunbeam, the original work being done by R. J. H. DeLoach and the final selection being made by L. E. Rast in 1912. The variety comes from a single plant and the plant-to-the-row method has been followed in developing it. The variety is of vigorous growth with few vegetative branches; it is an early yielder and has averaged 885 pounds of lint cotton per acre in the experimental plats since 1914.—T. H. McHatton.

26. CHILDS, R. R. **Cotton production and boll weevil control.** Georgia State Coll. Agric. Bull. 238. 28 p., 15 fig. 1921.—The recommendations for cotton production under boll-weevil conditions include the production of home supplies, early planting and good care of the crop, and the use of calcium arsenate against the weevil.—T. H. McHatton.

27. CHILDS, R. R. **Seed selection on the farm.** Georgia State Coll. Agric. Bull. 241. 16 p., 9 fig. 1921.—Diagrams of seed plats and directions for selecting and improving various farm crops are given.—T. H. McHatton.

28. CLARK, S. P. **Rhodes grass in Arizona.** Arizona Agric. Exp. Sta. Circ. 36. 3 p. 1921.—Rhodes grass is valuable for pasture and hay fields on very alkaline soil. It withstands drought fairly well but a temperature below 15°F. is usually fatal. The average yield is 3-6 tons per acre.—Herbert C. Hanson.

29. CROSS, W. E. **Distancia a que se debe plantar la caña de azucar.** [Distance for planting sugar cane.] Rev. Indust. y Agric. Tucuman 11: 113-118. 1921.—Work to ascertain the best distance between rows of cane was begun in 1915 and carried on in 1920. The varieties used were P.O.J. 36, P.O.J. 213, Kavangire, and Zwinga. Plantings were made at distances of from 0.9 to 2.4 m., practically identical yields being obtained from all. The closer the rows, the more numerous but smaller in diameter were the stalks. The distance recommended for Tucuman depends upon the cultural methods employed. With hand work 2.4 m. is most economical, with machinery 1.8 or 2.0 m. Closely spaced rows with more stalks per row are more expensive to plant, cultivate, and harvest.—John A. Stevenson.

30. CROSS, W. E. **Estudios de la caña dejada dos años en ple.** [Studies of cane left standing two years.] Rev. Indust. y Agric. Tucuman 11: 85-99. 1920.—The 1919 cane crop of Tucuman was too large to harvest during the grinding season. The planters were confronted with the problem of cutting and burning the unharvested cane to permit a ratoon crop, or to risk souring and rotting of the cane if left over until the following season. Experimental studies were made with certain of the Javan seedling varieties and Kavangire. Under usual conditions it was found to be satisfactory to leave cane uncut until the 2nd year. Such cane contained more fiber than 1-year old cane and there was a slightly lower extraction. No difficulties were experienced with the juice in the mill. The cane should be worked up as soon as possible after cutting.—John A. Stevenson.

31. CROSS, W. E. **Las posibilidades de las cañas de Java en Luisiana.** [Possibilities of the Javan canes in Louisiana.] Rev. Indust. y Agric. Tucuman 11: 118-121. 1921.—The P.O.J. seedlings developed in Java are hybrids between the hardy Indian canes native of subtropical regions and the large tropical non-hardy Javan types. They are resistant to disease, cold, and other unfavorable conditions. Their introduction met the situation in Argentina when the native varieties failed. They are recommended for Louisiana where the cane growers are attempting to grow tropical varieties under subtropical conditions. The Javan canes are very resistant to the mosaic disease, and the author recommends their introduction even though they may carry the disease.—John A. Stevenson.

32. CROSS, W. E. Nuevos estudios sobre las cañas tucumanas de semillero. [New studies with Tucuman seedling canes.] Rev. Indust. y Agric. Tucuman 11: 57-62. 1920.—A continuation of work previously reported upon [Ibid. 9: 161-167] involving the 1919 seedlings (first ratoons) and 1920 seedlings. Determinations of Brix, sucrose, purity, glucose, and yield were made. Low-yielding varieties or those poor in sucrose were discarded. Observations as to relative resistance to freezing are also recorded.—John A. Stevenson.

33. CROSS, W. E. Un ejemplo de la resistencia de la caña de Java a las heladas. [An example of the resistance of the Javan canes to freezing.] Rev. Indust. y Agric. Tucuman 11: 103-105. 1921.—Sugar cane in Tucuman was subjected to 5 days of freezing weather in July. Native varieties spoiled very quickly but the Javan varieties P.O.J. 36, 213, 228, and 234, and Kavangire stood up well through September and October. Chemical tests showed a falling off in sucrose and purity with an increase in glucose content during November and December.—John A. Stevenson.

34. CULLARE, JAUME. El conreu de l'alfals. [Alfalfa culture.] Rev. Inst. Agric. Catalan de San Isidro 70: 45-47, 139-141, 153-156. 1921.—Popular.—John A. Stevenson.

35. CUNNINGHAM, W. S. Sudan grass versus alfalfa hay for dairy cows. Arizona Agric. Exp. Sta. Timely Hints for Farmers 139. 4 p. 1922.—The results of a single feeding experiment show that alfalfa produced more milk than did Sudan grass.—Herbert C. Hanson.

36. DAWE, M. T. Arghan—the mysterious fibre which hails from the unknown. Tropic. Life 18: 86. 1922.—The author reports the organization of an Arghan Company "for the purpose of obtaining supplies of Arghan plants from their native habitat in the wilds and transplanting these into organized areas in British Dominions in the East." Dawe says that merchants who have received samples of Arghan fibre are unable to distinguish it from the Columbian pita fiber believed by botanists to be the product of *Ananas macrodontes* Morren, and a closely allied species or variety [see Bot. Absts. 8, Entry 1593]. It is intimated that the name Arghan is a camouflage intended to divert the hunt for this plant from South and Central America to the region of the Arghandab River in Afghanistan, and the author proposes 3 questions designed to bring out the truth in regard to Arghan.—H. N. Vinal.

37. DOBBS, A. C. The improvement of agriculture in Bihar. Agric. Jour. India 16: 138-141. 1921.—The author advocates the study of agriculture by Bihari students.—A. Howard.

38. EASTERBY, H. T. Sugar experiment bureau. Summary of 21 years' work. Australian Sugar Jour. 14: 284-286. 1922.—This 3rd paper gives a summary of fertilizer experiments with plant and ratoon crops of cane.—C. Rumbold.

39. ESTRADA, MARIO. Utilidad de las leguminosas en la agricultura. [Value of the legumes in agriculture.] Rev. Soc. Rural Cordoba [Argentina] 21: 5717-5728. 1921.—The value of leguminous plants as forage crops and nitrogen gatherers is discussed.—John A. Stevenson.

40. FAIN, JOHN R. Alfalfa for Georgia. Georgia State Coll. Agric. Bull. 217. 12 p. 1920.—Types of alfalfa (*Medicago sativa* L.), also soils, preparation of land, fertilizers, seeding, cultivation, cutting, as well as uses of this crop are discussed.—T. H. McHatten.

41. FAIN, JOHN R., and PAUL TABOR. Hay crops for Georgia. Georgia State Coll. Agric. Bull. 237. 20 p., 17 fig. 1921.—A general discussion is presented of 30 hay and forage crops adapted to Georgia with outline maps designating the sections especially suitable to the various plants.—T. H. McHatten.

42. FAULKNER, O. T. Tests of Punjab wheats Nos. 11 and 8A at Lyallpur 1915-20. Agric. Jour. India 16: 508-518. 1921.—These 2 varieties have been compared for 5 years on 170 pairs of plots and found to be very similar in yielding power. From the miller's point of view, Punjab 11 is considered preferable.—A. Howard.

43. FERRIS, E. B. Peanuts. Mississippi Agric. Exp. Sta. Bull. 208. 14 p. 1922.—This is a revision of Bull. 130. Varieties are described and the "White Spanish" is given as the best for south Mississippi. Soil requirements, preparation of land, fertilizers, cultivation, harvesting, yields, value as soil builders, and uses are discussed somewhat in detail. Tables are given comparing the feeding value of peanut hay with other hay crops, average composition of the food and fertilizing constituents in different parts of the plant.—J. Fred O'Kelly.

44. FINLOW, R. S. Historical note on experiments with jute in Bengal. Agric. Jour. India 16: 265-279. 1921.—A short chronological account is given of the investigations on jute (*Corchorus capsularis* and *C. olitorius*) in Bengal since 1904. Various races have been isolated by selection which yield more than the ordinary crop. Kakya Bombai, a strain of *C. capsularis*, outyields local races about 250 pounds of fiber per acre. Chinsurah green, a selection from *C. olitorius*, has also given good results under experimental farm conditions.—A. Howard.

45. GAVILÁN, JUAN. Nuevos metodos de cultivo de cereales en secano. [New methods of cultivating cereals under "dry-land" conditions.] Información Agric. [Madrid] 12: 97-100. 3 fig. 1922.—Greatly increased yields have been obtained by the use of machinery in cereal cultivation in Spain. This has made it possible to raise within the country a larger percentage of its necessary breadstuffs.—John A. Stevenson.

46. GUZMANES, ANTONIO. Fertilización de la remolacha azucarera, patatas, y maiz. [Fertilization of the sugar beet, the potato, and corn.] Información Agric. [Madrid] 12: 108-109. 2 fig. 1922.—Directions for fertilizers to secure maximum yields are given.—John A. Stevenson.

47. HANMANTE, N. V. Experience of prickly pear as an emergency cattle food. Agric. Jour. India 17: 389-391. 1922.—During the famine of 1920-21 demonstrations of the value of prickly pear as a fodder for work cattle were carried out in the Ahmedabad District in Bombay. Over 1,500 starving cattle were fed with prickly pear from which the thorns were previously removed by burning and to which 2 pounds of cotton seed and 2-3 pounds of dry grass for each animal were added. There was a rapid improvement on this diet and after 2 months the animals became vigorous.—A. Howard.

48. HANSEN, ALBERT A. Austrian field cress: A new weed in the United States. Torreya 22: 73-77. Fig. 1. 1922.—In June 1921 *Roripa austriaca* Spach was found overrunning certain sections of Borderland Farm, New Milford, Orange County, New York. The plant was first introduced about 1910 in impure grass-seed and has spread by means of creeping roots until about 7 acres have become infested. It threatens to become a dangerous pest, and radical measures should be taken before it gets beyond control. It could probably be exterminated by spraying with iron or copper sulphate. Great loss can be prevented at very small cost if prompt action is taken.—J. C. Nelson.

49. HARSNBOWER, A. C. La alfalfa. Bol. Camara Agric. Costa Rica 1: 271-276. 1921.—Popular.—John A. Stevenson.

50. HAWKINS, R. S. Sudan grass in Arizona. Arizona Agric. Exp. Sta. Circ. 35. 5 p. 1921.—The author gives directions regarding the growing, harvesting, and uses of Sudan grass.—Herbert C. Hanson.

51. HENDERSON, J. W. Garlicky wheat. Rept. Maryland Agric. Soc. 6: 242-249. 1921 [1922].—Analyses of 462 samples of wheat secured in 21 out of 23 counties of Maryland show

that Maryland wheat is "garlicky" almost without exception. The presence of garlic bulbs in the wheat of 1921 caused an estimated loss of \$421,300 to the producer.—A. Lee Schrader.

52. ISHAQ, A. R. Rice cultivation in the Larkhana district, Sind (India). Bombay Presidency Dept. Agric. Bull. 99. 33 p., 1 map. 1920.—A preliminary study is reported of the Larkhana district, lying west of the Indus River. Soils, climate, and irrigation are briefly treated.—The cultivation of rice, of which 11 varieties are recognized by the trade, is discussed at length. Pests are not serious. Wheat or legumes frequently follow rice the same year.—Share land tenure, high land values, and scarcity of labor help to make the economic condition of the cultivators relatively good.—Robert L. Pendleton.

53. ITIÉ, GABRIEL. El cultivo del algodón en la comarca lagunera. [Cotton culture in the Laguna district.] Rev. Agric. [Mexico] 6: 255-262. 5 fig. 1921.—The article deals with the history and methods of cotton culture in the Laguna district of Mexico.—John A. Stevenson.

54. ITIÉ, GABRIEL. Una hierba dañina—el cardo. [The thistle, an injurious weed.] Rev. Agric. [Mexico] 7: 90-92. 3 fig. 1922.—The article concerns *Carduus* sp.—John A. Stevenson.

55. KELLOG, C. E. Feeding sorghum pomace as silage to cattle. Georgia State Coll. Agric. Bull. 221. 12 p., 3 fig. 1921.—Sorghum (*Sorghum vulgare* Pers. var. *saccharatum*) pomace makes good silage. Analysis yields the following percentages: water 73.5, ash 1.08, crude protein 1.14, crude fiber 7.82, nitrogen-free extract 14.74, and crude fat 0.66; it compares well with other silages and gave an average daily gain of 2.11 pounds on 80 steers averaging 840 pounds per head during a feeding period of 105.5 days. The ration used consisted of 36 pounds of sorghum pomace silage, 6.07 pounds of cotton seed meal, 5.4 pounds of cotton seed hulls, and a very small amount of molasses.—T. H. McHatton.

56. KENOYER, L. A. Retarded development of temperate cereal varieties under tropical conditions. Agric. Jour. India 16: 454-457. 1 fig. 1921.—Kanred wheat from Kansas grown at Allahabad, India, by the side of Pusa 12 remained in the vegetative state until harvest and then made feeble culms with small, badly-filled ears towards the end of the hot season.—A. Howard.

57. KERLE, W. D. Farmers' experiment plots. Potato experiments 1921-22. Upper north coast district. Agric. Gaz. New South Wales 33: 381-390. 3 fig. 1922.—Experiments were undertaken in cooperation with 8 farmers. Eighteen varieties of potatoes were under trial, including well known varieties such as Scottish Triumph, Satisfaction, Factor, Up-to-date, Early Rose, Carman No. 1, and Early Manistee. The maximum yield of 315 bushels per acre was secured from Early Manistee grown at Condong on the Tweed River. Scottish Triumph, Early Manistee, and Early Manhattan were among the higher yielding sorts. The crop was injured on some farms by late blight caused by *Phytophthora infestans*. In the manual trials a complete fertilizer gave highest yields. Trials were made with various sized seed tubers planted at different rates.—L. R. Waldron.

58. KIRJASSOFF, ALICE BALLANTINE. Formosa the beautiful. Nation. Geog. Mag. 37: 247-292. 69 fig. 1920.—Details are given of the production of tea and camphor.—W. M. Atwood.

59. KNIGHT, J. B. Prickly pear as a cattle food. Bombay Presidency Dept. Agric. Bull. 97. 63 p., 18 pl. 1920.—The prickly pear (*Opuntia elatior* Mill.) was introduced into India about 1800 A.D., and is now quite common as a weed in many parts of the Bombay Presidency. During various famines it has been tried as a cattle feed, but not until 1918-19 was it used on a large scale.—The author describes in detail the feed value of the plant, showing

that it contains a high percentage of water and is low in protein. This necessitates the feeding with it of concentrated feedstuffs. Methods of removing the spines mechanically and by means of burning with gasoline torches and blacksmiths' forges, and the relative merits of the various processes are described. Full instructions are given for operating large famine camps for saving cattle. It is believed that thornless cactus may become an important fodder reserve for adverse years.—A bibliography of 26 titles is given.—*Robert L. Pendleton.*

60. KOESLAG, J. D. *De pootgoedverwisselingsproeven met Eigenheimers van het Centraal Comité in 1920 en 1921.* [Exchange of seed experiments with Eigenheimer seed potatoes by the Central Committee in 1920 and 1921.] *Cultura* 34: 94-108. 1922.—The object of the experiments is to ascertain whether the variety produces yields of different quality when grown for more than 1 year in the same section. Seed potatoes of the same origin were planted in different localities of the Netherlands. Diseases appeared sooner in some localities than in others. The experiments will be continued for several years.—*J. C. Th. Uphof.*

61. KOTTUR, G. L. *An improved type of cotton for the Dharwar-American tract.* *Agric. Jour. India* 17: 347-352. 1922.—For 6 years a selection from Dharwar-American cotton, known as Gadag 1, has given a better yield of lint and a higher ginning percentage than the ordinary crop.—*A. Howard.*

62. KULKARNI, L. B. *A discovery: Andropogon purpureosericeus and its importance in the improvement of grazing areas in the Bombay Deccan.* *Agric. Jour. India* 16: 388-395. *Pl. 22.* 1921.—This indigenous fodder grass is suitable for poor land, grows quickly, and yields up to 5,000 pounds of fresh produce useful for silage. It is somewhat drought resistant and suppresses *A. contortus*, the dominant species on most of the poor land of the Bombay Deccan. Both in the fresh condition and when dry it is preferred by cattle to *A. contortus*.—*A. Howard.*

63. LEAKE, H. MARTIN. *The bases of agricultural practice and economics in the United Provinces, India.* *viii + 27 p.* W. Heffer & Sons: Cambridge, 1921.—The book, based on lectures delivered to the students of Cawnpore Agricultural College, attempts to state the fundamental problems of agriculture in India and the lines along which improvement is to be sought. The scope of the book is indicated by the section headings: origin of agriculture; basis of agricultural practice (environmental conditions and plant growth); basis of agricultural economics (land, ownership, capital, production, and markets); development of agricultural practice (improvement of crops and of methods of cultivation); and development of agricultural economics (cooperative effort, the role of land-owner, government, and money-lender in agricultural improvement, and the cattle problem). [See also Bot. Absts. 11, Entry 6.]—*Winfield Dudgeon.*

64. LEIDNER, R. *Vorschläge zur Vereinfachung der technischen Durchführung von Feldversuchen.* [Proposals for simplifying the technic of field experiments.] *Landw. Jahrb.* 54: 283-288. 1919.—The author discusses methods designed to increase the accuracy of the results and to lessen the labor involved in harvesting and recording the yields of experiment plots.—*H. S. Reed.*

65. LEWIS, A. C. *Cotton variety tests 1920.* *Georgia State Bd. Entomol. Circ.* 35. 4 p. 1921.—For south Georgia, Lewis 63 and Council Toole are recommended where wilt occurs; for north Georgia, Wanamaker-Cleveland, Toole, Cook's Improved, and College No. 1 are recommended.—*T. H. McHatten.*

66. LEWIS, A. C., and C. A. McLENDON. *Cotton variety tests 1919.* *Georgia State Bd. Entomol. Circ.* 29. 10 p. 1920.—Variety tests were conducted in 7 counties of the state with the following varieties: Lewis 63, Council-Toole, Petty-Toole, Dixie Improved, Covington-Toole, DeSoto, Dixie Triumph (South Carolina), Toole (Toole), Cook's Improved, Cook 307-6, College No. 1, Cleveland (Wanamaker and other strains), King, Bank Account, Broadwell,

Trice, Simpkins, Hooper, Meadows, Half and Half, Dillon, Poulnot, Modella, Dix-Aññ, Webber No. 49, Express, Big Boll Express, and Meade. In south Georgia Lewis 63 and Council-Toole gave best results and in east and north Georgia the Wanamaker-Cleveland headed the list.—*T. H. McHatton*.

67. LORENZETTA, JOSÉ R. El cuidado de los alfalfares. [Care of alfalfa fields.] Rev. Soc. Rural Cordoba [Argentina] 21: 5902-5911. 1921.—Methods of maintaining alfalfa fields are discussed.—*John A. Stevenson*.

68. McCAULEY, C., and L. J. GREEN. Oat variety trials, 1921. Cowra experiment farm. Agric. Gaz. New South Wales 33: 411-413. 1922.—In the early planting trial Fulghum yielded best at 58 bushels per acre while in the late planting trial it stood 2nd and Wilga, a new variety, 1st at 54 bushels. Brief notes are given on a similar trial at Yanco.—*L. R. Waldron*.

69. McDIARMID, R. W. Elephant grass (*Pennisetum purpureum*) at Coonamble experiment farm. Agric. Gaz. New South Wales 33: 431. 1922.—Under irrigation Elephant grass did remarkably well.—*L. R. Waldron*.

70. McLEAN, K. Water hyacinth. A serious pest in Bengal. Agric. Jour. India 17: 23-40. Pl. 2-3. 1922.—The water hyacinth (*Eichornia crassipes*), first noticed in Bengal about 1898, has now become a serious pest in the Gangetic delta where it interferes with navigation and the cultivation of deep-water rice. High floods in 1917 were followed by a check in the spread of the pest during 1918 and 1919. Since then it has spread rapidly, particularly in rivers and channels where the current is feeble. The plant reproduces itself vegetatively in Bengal and sets only a few seeds. These the author so far has failed to germinate. Operations against the spread of the weed consist in making the weed into manure and converting it into ash which is several times richer in potash than wood ashes. Attempts to extract potassium chloride from the ash proved a commercial failure. A committee has been formed by the Bengal Government to enquire into the spread of this pest in Bengal and to suggest measures for its eradication.—*A. Howard*.

71. MAJMUDAR, U. M. A comparative study of some agricultural aspects of Gujarat and the Deccan. Poona Agric. Coll. Mag. 12: 124-127. 1921.—A statistical comparison is presented of the total crop production, the yields of the various crops, and the total population-sustaining powers of the 2 districts.—*Robert L. Pendleton*.

72. MANN, H. H., S. D. NAGPURKAR, G. S. KULKARNI, R. S. KASARGODE, S. R. PARANJPE, and B. M. JOSHI. Investigations on potato cultivation in western India. Bombay Presidency Dept. Agric. Bull. 102. ii + 142 p., 9 pl. 1920.—Descriptions are given of the methods of potato culture near Poona, Mahabaleshwar, and Dharwar. Crops are raised in the summer or rainy season, and in the winter season. The seed rate is about 1,200 pounds per acre. About 3 tons of farm yard manure per acre are applied annually. It would be profitable to reinforce this with ammonium sulphate, potassium sulphate, and superphosphate. The main variety grown is of Italian origin, as when transportation is normal the annual seed potato supply comes from Italy. There are 3 local varieties raised in the hills; the yields are good. English or Indian seed potatoes raised in the higher mountains are not at all suitable for western India. Difficulties of using local potatoes for seed are: serious infection and unsuitability of village storage conditions and methods.—Potato storage demands thorough aeration and a maximum temperature of not over 90°F. otherwise "black heart," a physiological disease, causes heavy to complete loss. Data are given of a chemical study of changes in the "black heart" or "heat rot" disease. Sacking in bags, placed on end and separated, decreases the loss. In extremely hot weather moist canvas must be hung in the doorways.—Other serious pests are the potato moth (*Phthorimea operculella*), ring disease, and tambara disease. Less serious diseases are caused by *Fusarium* spp., *Rhizoctonia* sp., *Spongospora* sp., the potato stem borer (*Leucinodes orbonalis*), and occasionally the potato eel worm. Against the potato moth, fumigation with

petrol in masonry chambers is followed by sacking to keep out moths. The ring disease is very severe, causing 20-60 per cent decrease in yield. Within 5 years the disease can be reduced in a given area to a 1 per cent incidence by rigorous selection of seed. Local pure seed supplies will have to be maintained.—Plans of an improved potato storage warehouse are given.—*Robert L. Pendleton.*

73. MILLIGAN, S. Improved field for agricultural investigations. *Agric. Jour. India* 16: 244-250. 1921.—The need is discussed of a special organization of investigation to make practical use of the results of research work on soil and crops.—*A. Howard.*

74. MITRA, S. K. A method of rice selection in Assam. *Agric. Jour. India* 17: 240-241. 1922.—Simple methods of selecting the best ears for seed as practised by the cultivators in Assam are described.—*A. Howard.*

75. MITSCHERLICH, E. ALFRED. Ein Beitrag zur Technik des Sortenanbauversuches. [A contribution to the technique of variety-testing experiments.] *Landw. Jahrb.* 57: 191-201. 1922.—The author has previously [Ibid. 54: 742-745] suggested a method whereby the largest experimental error due to the diversity of the soil is eliminated. By determining the amount of seed to be used by the formula $s = \frac{K 100g}{G}$ in which s = quantity of seed per hectare, K , 100 = weight of individual seed g , and G germination, it was found that the crop yield is a function of the amount of seed used. In cereals, the quantity of seed to be used is increased to 140 kgm. per hectare,—for winter barley, 160,—the distance of sowing depending, however, on the germination of the seed and weight of 1000 grains. When it is feared, however, that too thick sowing may bring about lodging, particularly on rich soils, the amount of seed may be reduced without committing a great error to 120 and 140 kgm. respectively. Potatoes are planted at a distance of 50 × 60 cm.—*Selman A. Waksman.*

76. MITSCHERLICH, E. ALFRED. Feldversuche mit Kartoffeln. [Potato field trials.] *Landw. Jahrb.* 54: 703-745. 1919.—The size of the experimental plots is one of the main factors to be determined. In one experiment 5 varieties were used and the plots were laid out in 4 sizes varying from 3.6 to 237.6 square m.; to overcome soil variability each plot was replicated 4 times. In another experiment fertilizers containing either 1, 2, or all 3 essential elements were applied. The method of laying out the plots was the same as for the other experiments, excepting a variation in the size of the plots from 7.2 to 259.2 square m. The data show that a 50 square m. plot is sufficient for potato experiments. The questions of proper spacing and the size of the seed pieces were also investigated. The general conclusion was reached, based on statistically treated data, that the best distance is 35 × 40 cm. for a seed piece weighing 65 gm.; for smaller seed pieces closer planting is advocated. It is pointed out that under different climatic and soil conditions entirely different results may be obtained. As part of these field trials an experiment was carried out in which various potassium salts were applied on a soil poor in potassium. The results with potassium were considered inconclusive, not only as to yield, but also as to the starch content and dry weight of the tubers harvested. In the Appendix an example of the application of Peters formula, $V = \pm 0.8453 \frac{\sum (+v)}{\sqrt{n(n-1)}}$ is given. By means of this method the probable error of a single plot was reduced.—*F. F. Halma.*

77. MORRILL, A. W. Corn as a trap crop for the cotton bollworm. *Arizona Agric. Exp. Sta. Circ.* 30. 10 p. 1920.—The growing of corn and cowpeas to serve as a trap crop for the cotton bollworm is advocated. Vacant spaces and ditch banks offer favorable locations for the crop.—*Herbert C. Hanson.*

78. MÜNTER, F. Zum Mais- und Sonnenblumenanbau. [Culture of maize and sunflowers.] *Mitteil. Deutsch. Landw. Ges.* 37: 268-268. 1922.—A brief account is given of trials at Halle with several American and European varieties of maize and sunflowers.—*A. J. Pieters.*

79. NELSON, JAMES C. A new weed from Oregon. *Torreya* 22: 86-88. 1922.—*Salvia Aethiopsis* L. was found in 1920 growing in great abundance in a field of alfalfa near Lakeview, Lake County, Oregon. It is spreading rapidly and threatens to become a dangerous pest. This plant was supposed by Linnaeus to be identical with the "Aethiopsis" cited by classical authors as a plant of medicinal value. It seems to have been imported in alfalfa seed from Russia.—J. C. Nelson.

80. NEUMANN, O. Die Wintergerste. Ihre Kultur und ihre Verwendungsmöglichkeiten. [Winter barley. Its cultivation and possible uses.] *Landw. Hefte* 48: 5-36. 1921.—The cultivation of winter barley increased in Germany during and since the war. This increase was stimulated by the great decrease in the importation of nitrogenous feeds. The present area is sustained by the limited importation due to low purchasing power of German money and the lack of cheap supplies in Russia. In 1919, 137,000 hectares were seeded to winter barley. The winter barleys commonly cultivated are mostly varieties of the 6-row winter form long cultivated in Europe. The culture of winter barley spread into Germany from Holland; this was accompanied by selection which increased winter hardiness. Winter barley has been found to have many advantages. It yields well, starts growth before spring weeds, distributes labor to greater advantage, ripens early and permits late summer crops to follow. Winter barley is seeded between the last of August and the middle of September after root crops, early peas, green fodder, winter rye, or winter barley. A number of local strains have been produced by various breeders. Winter barley as produced in Germany is suitable for feed, for distilling, and in limited quantities mixed with summer 2-row barley can be used in brewing.—H. V. Harlan.

81. NOLTE, O. Düngungsversuche mit verschiedenen Phosphorsäuredüngern zu Zuckerrüben. [Various forms of phosphoric acid as fertilizing materials for sugar beets.] *Illustr. Landw. Zeitg.* 41: 463-464. 1921.—Conclusions are given resulting from experiments in which equal amounts of phosphoric acids were used in the forms of superphosphate, Thomas slag, "Rhenania" phosphate, and bone meal. The highest sugar contents were obtained from plats treated with Thomas slag and "Rhenania" phosphate, but the acid phosphate also gave excellent results. The results from bone meal were comparatively poor.—John W. Roberts.

82. OPITZ. Über Getreidesaatenanerkennung [Certification of seed grain.] *Mitteil. Deutsch. Landw. Ges.* 37: 462-464. 1922.—The author discusses the points to be considered in making a field inspection. Specific and varietal genuineness and purity, and presence of weeds and diseases are discussed in detail.—A. J. Pieters.

83. PARR, A. E., and PUTTOO LAL. A valuable cattle fodder. *Agric. Jour. India* 16: 206-208. 1921.—Feeding experiments with baisurai (*Pluchea lanceolata*), a common deep-rooting weed of the hot season in the Agra Division, mixed with dry millet stalks gave better results with work cattle than a ration of millet stalks alone. The utilization of this weed would help to solve the shortage of fodder in this tract.—A. Howard.

84. PATEL, M. L. The connection between seed weight and lint weight in cotton. *Agric. Jour. India* 17: 204-205. 1922.—As in other types of cotton, an increase in the weight of lint per seed involves an increase in the weight of the seed in the *herbaceum* cottons of Gujarat.—A. Howard.

85. PATIL, P. C. Summary of the work done on Jalgaon farm (Bombay Presidency, India). *Bombay Presidency Dept. Agric. Bull.* 108. 11 + 53 p. 1921.—Data are largely in tabular form, and conclusions are frequently not stated.—The farm was established for producing pure seed of *neglectum roseum* cotton in quantity for distribution.—Meteorological records are included. Rainfall influences crop growth more by its distribution than by its quantity.—The yields of all the important crops are increasing due to the use of modern methods. Valuable local manures are castor cake, sheep folding, and night soil; a practical method of applying

the last is described.—Some attention has been devoted to experiments on manuring, green manuring, rotations, hybrid and selected cottons, and variety trials. Peanuts proved of special value in the rotations.—*Robert L. Pendleton.*

86. PATTERSON, H. J. Lessons learned from twenty years of fertilizer tests. Rept. Maryland Agric. Soc. 5: 336-340. 1920 [1921].—This paper summarizes the effects of fertilizers on yield, quality, color, maturity, and abundance of weeds. The time and method of application are also discussed.—*A. Lee Schrader.*

87. PORTER, JOHN. The spraying of cornfield weeds with sulphate of ammonia. Jour. Ministry Agric. Great Britain 28: 1109-1116. 1922.—Preliminary trials in spraying grain fields with sulphate of ammonia for weed control gave satisfactory results with charlock (*Sinapis arvensis* L.), wild white mustard (*S. alba* L.), ivy leaved speedwell (*Veronica hederifolia* L.), and sheep's sorrel (*Rumex acetosella* L.). The chemical was only partially effective for corn, buttercup (*Ranunculus arvensis* L., *R. repens*, and *R. acris*), dandelion (*Taraxacum Dens-leonis* Desf.), broad dock (*Rumex obtusifolius* L.), and common field thistle (*Carduus arvensis* Curt.), and almost ineffective for black mustard (*Sinapis nigra* L.), black bindweed (*Polygonum convolvulus* L.), and milk or sow thistle (*Sonchus arvensis* L.).—The spray fluid consisted of 2 cwt. of sulphate of ammonia dissolved in water and made up to 60 gallons. The sulphate of ammonia is not as effective or reliable as copper sulphate though where it is effective it has the added advantage of greatly stimulating the growth of the cereal crop through its value as a fertilizer.—*M. B. McKay.*

88. REGEL, C. VON. Heuanalysen von der Halbinsel Kola. [Analyses of hay from the Kola peninsula.] Landw. Jahrb. 54: 277-281. 1919.—This paper gives the results of botanical analyses of 8 samples of hay collected from fertilized and unfertilized meadows at 2 stations within the Arctic Circle. On the fertilized meadows *Poa pratensis* was the dominant species while on only 1 of the unfertilized meadows was there any considerable amount of this grass. *Vicia cracca* occurring in 2 samples is the only legume reported.—*A. J. Pieters.*

89. RICHARDSEN, A. Fruchtfolgen und statischer Versuch in der akademischen Gutswirtschaft Dikopshof. [Rotations and statistical studies at the academic estate Dikopshof.] Landw. Jahrb. 53: 109-165. 1919.—A series of rotation and fertilizer experiments started in 1904 are reported. Various fields were laid out, different rotations being followed in each with and without stable manure and artificial fertilizers. The statistical study covers 1905-13 and consists of a detailed report with tables giving yields of sugar beets, rye, wheat, red clover, vetch, and oats, with and without nitrogen, phosphoric acid, potash, and lime.—*A. J. Pieters.*

90. RICHTHOVEN, VON. Saatkartoffelbeizung. [Treating seed potatoes.] Mitteil. Deutsch. Landw. Ges. 37: 386-387. 1922.—The author gives a preliminary report on an experiment in treating seed potatoes with "Uspulum." The treatment did not injure the seed potatoes and appeared to result in stronger initial growth.—*A. J. Pieters.*

91. ROEMER, THEODOR. Der Feldversuch. [The field experiment.] Arbeit. Deutsch. Landw. Ges. 302. 69 p. 1920.—A critical study is reported of plot experiments, including the various factors, methods, sources of error, size, position and shape of plots, and number of replications. BAULE adds a supplement in which he discusses mathematically the question of average or probable variation.—*A. J. Pieters.*

92. ROSS, H. Field experiments with wheat, 1921. Wagga experiment farm. Agric. Gaz. New South Wales 33: 403-408. 1922.—A number of new varieties of wheat were tested in comparison with a few standard varieties. Hard Federation outyielded most of the new varieties. The remaining trials included a test of wheat varieties for hay with and without fertilizers and similar trials with oats. Algerian oats gave the best results. Notes on a barley trial are given.—*L. R. Waldron.*

93. ROSS, H. A. The production and utilization of manure on Illinois dairy farms. Illinois Agric. Exp. Sta. Bull. 240. 473-489. Fig. 1-3. 1922.—The discussion of the amount of manure recovered per animal unit, possible rates of applying, methods of utilizing, seasonal applications, and labor cost of hauling is based on detailed cost-accounting investigations conducted 1912-1919 on 87 farms.—O. H. Sears.

94. SAILLARD, EMILE. La teneur en chlore de la betterave à sucre pendant la végétation. [The chlorine content of the sugar beet during vegetation.] Ann. Sci. Agron. Française et Étrangère 38: 152-157. 1921.—The possibility of using ammonium chloride, a by-product from the manufacture of sodium carbonate by the Solvay process, as a nitrogenous fertilizer in place of ammonium sulphate or nitrate raised a question as to the effect on the growth of the sugar beet and the extraction of sugar. Analyses are reported showing the water, nitrogen, ash, and chloride content of different parts of the beet at 5 periods of growth. The petioles together with the principal vein of the leaves are shown to contain most of the chlorine, and in all cases the chlorine content increases as the season progresses.—A. B. Beaumont.

95. SANYAL, P. B. The plant *Carica Papaya* and its enzyme. Agric. Jour. India 16: 496-507. 1921.—The yield of crude papain during the rains at Pusa was 16-18 per cent of the juice. The sample contained a globulin, an albumin, aibumoses in considerable quantity, and a milk-curdling ferment. The method of preparing the pure product from the latex is described.—A. Howard.

96. SARABIA, G.M.O. Elección de semilla de alfalfa. [Selection of alfalfa seed.] Bol. Soc. Agric. Norte [Chile] 11: 61-63. 1921.—Methods are outlined for selecting alfalfa seed to insure best yields.—John A. Stevenson.

97. SCHULTZ, E. F. La alfalfa común y los tipos invernales de alfalfa en Tucuman. [Common alfalfa and the winter types of alfalfa in Tucuman.] Rev. Indust. y Agric. Tucuman 12: 17-32. 4 fig. 1921.—The author stresses the importance of alfalfa as the standard forage crop of Tucuman. Alfalfa in Tucuman should be planted during the period March to May, when there is sufficient moisture for germination. The soil should be well prepared and inoculation with soil from an old field is desirable in new fields. Other crops should not be interplanted. *Cuscuta*, a bad pest, can be exterminated by cutting the crop on a hot day and removing the hay from the field. Alfalfa is of particular value in rotation with sugar cane. Since rain makes hay making difficult much of the time, the use of silos, either of the stack or pit type, is recommended. Peruvian is the best variety yet tried but export of the seed has been forbidden by the Peruvian government. A local strain, known as No. 3, has been developed in consequence and has all the advantages of the Peruvian.—John A. Stevenson.

98. SCHULTZ, E. F. La "*Phalaris bulbosa*" en la provincia de Tucuman. [*Phalaris bulbosa* in the province of Tucuman.] Rev. Indust. y Agric. Tucuman 11: 63-74. 9 fig. 1921.—*Phalaris bulbosa* has been extensively studied in Argentina, including 5 years' experimental work at the Tucuman experiment station. The grass does not compare in value with Peruvian alfalfa as a forage crop, the latter giving yields 2-4 times greater. When propagated by seed it is easily overrun by weeds, due to poor germination; and when propagated by division the cost is excessive. Yields are reduced by the low-growing habit of the plant and its failure to make growth during fall and winter. The use of the grass is recommended only on sites where the water table is so close to the surface that the alfalfa roots rot.—John A. Stevenson.

99. SCHULTZ, E. F. Notas adicionales sobre la grama Rhodes. [Additional notes on Rhodes grass.] Rev. Indust. y Agric. Tucuman 11: 141-152. 5 fig. 1921.—Grazing experiments showed that Rhodes grass (*Chloris gayana*) is very resistant to freezing as well as to heat and trampling by stock. Cattle eat even the frozen material. The grass may be pastured close without injury and makes new growth in August when other pasturage is lacking. The shallow growing rhizomes permit of easy eradication by disking. It is not poisonous at any

stage of its growth. Stock pastured on this grass made satisfactory growth and produced meat of high quality. The grass seeds freely. Plantings should be made in the warm, rainy season to insure best stands, although success has been obtained at all seasons.—*John A. Stevenson.*

100. SHOWALTER, WILLIAM JOSEPH. Cuba,—the sugar mill of the Antilles. *Nation. Geog. Mag.* 38: 1-33. 24 fig. 1920.—Included in the description of Cuba is a discussion of the sugar and tobacco production of the island.—*W. M. Atwood.*

101. SMITH, F. H., and T. S. BUTE. Cotton fertilization experiments—1920. *Georgia Agric. Exp. Sta. Bull.* 137. 10 p., 1 fig. 1920.—Four types of raw phosphate were compared as sources of phosphorus for cotton (*Gossypium herbaceum*), none proving definitely superior. Indications are that raw ground phosphate may furnish some phosphorus during the 1st season; 2 successive applications give yields comparable to those with acid phosphate. Better yields were obtained when the raw phosphate was composted before using. Early applications of top dressings are advisable. On neutral soil, lime applications did not increase the yield. On heavy clay soils potash does not seem necessary; on sandy lands it is applied with profit. A 5-year test shows that on rich lands the rate of increase in cotton production is greatest for the first 200 pounds and that when complete fertilizers are applied the rate of increase in yield remained constant for applications heavier than 400 pounds per acre.—*T. H. McHatton.*

102. SNIDER, H. J. Recent crop yields from soil experiment fields in Illinois. *Illinois Agric. Exp. Sta. Circ.* 260. 8 p. 1922.—This circular presents in tabular form yields of wheat, corn, and oats obtained on a number of soil experiment fields located in different parts of the state. The figures cover a period of from 3 to 5 years, according to the duration of the rotation, in all cases ending with 1921.—*Mary R. Burr.*

103. SOULE, ANDREW M. Some factors affecting the economic production of cotton. *Georgia State Coll. Agric. Bull.* 247. 16 p., 5 fig. 1922.—The South is said to be losing its control of the world's cotton.—*T. H. McHatton.*

104. STAPLEDON, R. G. Germination of indigenous grass and clover seeds. *Jour. Ministry Agric. Great Britain* 29: 118-125. 1922.—Comparisons are made of the germinating capacity and other characteristics of seed collected from plants growing in their natural habitats with seed "once grown" at Aberystwyth and with ordinary commercial samples. The seed of indigenous species collected from various habitats tends to be of poor germinating capacity due in part to insects and in part to the difficulty of harvesting large quantities of seed under suitable and similar conditions. "Once grown" seed appears to be less attacked by insects and to germinate more satisfactorily. The precise value of "once grown" bulk-collected seed of such important grasses as perennial rye grass, cocksfoot, timothy, meadow foxtail, and others can only be determined by further investigation. It would seem from the results with wild white clover that reasonably good results may be expected from the inclusion of such "once grown" seed in mixtures designed for the preparation of long duration and permanent grass. The trials so far conducted at Aberystwyth tend to show that indigenous cocksfoot, rye grass, and timothy, for instance, have important qualities for long-duration pastures and are undoubtedly more persistent than their commercial counterparts.—*M. B. McKay.*

105. STAPLEDON, R. G. The growing and marketing of improved strains of herbage plants. *Sci. Agric.* 2: 405-408. 1922.—This address by the director of the plant breeding station at Aberystwyth, Wales, before the 1922 convention of the Canadian Society of Technical Agriculturists deals with work on clovers and grasses.—*B. T. Dickson.*

106. STEWART, ROBERT. The Illinois system of permanent soil fertility as developed by Cyril G. Hopkins. *Illinois Agric. Exp. Sta. Circ.* 245. 20 p., 14 fig. 1920.—In this address

before the Ohio Agricultural Experiment Station the basic principals of the Illinois system of permanent agriculture are discussed.—O. H. Sears.

107. TABOR, PAUL. Peanuts for the Piedmont section of Georgia Georgia State Coll. Agric. Bull. 249. 4 p., 1 fig. 1922.—A general discussion is presented of the preparation, cultivation, and harvesting of peanuts (*Arachis hypogaea* L.).—T. H. McHatton.

108. TAYLOR, C. SOMERS. Experiments with castor seed conducted at Sabour. Agric. Jour. India 16: 146-151. 1921.—Experiments have been made to determine whether by chemical selection it is possible to improve the castor oil plant (*Ricinus communis* L.). The mean oil content of the types grown at Sabour was 49.5 per cent. In the majority of cases the parent plants did not transmit a high or low oil-yielding tendency but in nearly every instance yielded seed with the oil content near the mean when the plants were healthy and a little lower when the reverse was the case. The author concludes that variations in agricultural treatment may have more effect on the oil yield of the crop than actual chemical selection.—A. Howard.

109. THOMPSON, G. E. Hegari in Arizona. Arizona Agric. Exp. Sta. Circ. 33. 4 p. 1921.—Hegari, a sorghum resembling kafir in appearance, is especially valuable in southern Arizona because it matures in about 110 days. It can be planted as late as early July, after the wheat harvest, and still mature before frost. It is used for grain, fodder, and silage.—Herbert C. Hanson.

110. THOMPSON, O. A. Edgeley substation report. Year ending June 30, 1921. North Dakota Agric. Exp. Sta. Bull. 161. 8 p. 1922.—1921 yields of wheat, oats, and barley secured from summer tillage plats were materially greater than for continuous tillage plats. Likewise wheat and oats following fallow in rotations outyielded these crops following small grains in rotations. In comparison with similar unmanured plats wheat and oats on manured fallow land showed decreased yields due to lodging. Oats after clover gave largest yield in comparison with oats after brome grass, alfalfa, and small grains. Early fall plowing showed some superiority to late fall plowing or to spring plowing. Wheat on disced corn land outyielded wheat on plowed corn land. Durum wheats outyielded all other varieties. The largest yields were secured from the rust-resistant durums, Monad, Acme, and D-5. The highest yielding varieties of oats and barley were Big Four and Manchuria respectively.—L. R. Waldron.

111. THOMPSTONE, E. Agriculture in the Shan States with special reference to the system known as "taungya" cultivation. Agric. Jour. India 16: 251-264, 396-405. 1921.—The Shan States lie between Burma and China and consist of an irregular plateau, about 3000 feet high, made up of well-wooded, grassy, upland plains and of open, treeless, rolling downs. The average annual rainfall is about 60 inches. The ordinary system of agriculture is known as taungya and consists in cutting down the jungle and firing it during the dry season, February-May. After this a variety of crops are grown,—hill rice, maize, potatoes, sesame, ginger, groundnuts, sweet potatoes, gourds, opium, cotton, and beans. The land is cultivated 1-3 years and then allowed to lie fallow for 4-15 years. Experiments have been conducted for some years to ascertain the best method of bringing these areas into permanent cultivation. Promising results were obtained by the use of lime and organic and green manures. The author concludes that by these means, combined with good cultivation and rotation of crops, continuous cultivation would be much more profitable than the present method of shifting from place to place.—A. Howard.

112. THOWNBRIDGE, P. F. Report of the director, year ending June 30, 1921. North Dakota Agric. Exp. Sta. Bull. 159. 8 p., 2 fig. 1922.—For a 4-year average, wheat after clover yielded 22.2 bushels per acre, after potatoes 20.5 bushels, and after corn 20.4 bushels, on unmanured land. In a 9-year trial, stable manure increased wheat yields 2.6 bushels per acre or 12.5 per cent. In a 9-year period manure increased the yield of fodder-corn 527 pounds

per acre, or 8.5 per cent. Phosphatic fertilizers supplementing stable manure have increased yields of wheat less than 1 bushel per acre. Barley as a nurse-crop for sweet clover (*Melilotus alba*) tends to decrease seed production the 2nd year. In 1920 Assiniboine corn matured in 109 days and Minnesota 13 in 125 days.—*L. R. Waldron*.

113. VAGHOLKAR, B. P. Some observations on crude night-soil as manure to cotton in East Khandesh. Poona Agric. Coll. Mag. 12: 113-116. 1921.—“The rate and time of applying are the two most important factors that should be taken into consideration in using this manure for cotton.” In this part of India it should be applied before April. Judicious use has doubled the cotton yield for the year of application; the residual effect is small.—*Robert L. Pendleton*.

114. WALKER, G. B. Alfalfa in the Delta. Mississippi Agric. Exp. Sta. Bull. 209. 14 p., 4 fig. 1921.—The author discusses soils suited to alfalfa; preparation of seed bed; time, rate, and method of planting; inoculation; and time of cutting. Results of variety and fertilizer tests are given. Alfalfa as a pasture crop; alfalfa for coco-infested lands; getting grass out of alfalfa; and alfalfa in the crop rotation are each briefly discussed.—*J. Fred O'Kelly*.

115. WARD, F. C. Meade cotton. Georgia State Coll. Agric. Bull. 224. 4 p., 2 fig. 1921.—Meade cotton (probably *Gossypium herbaceum* × *G. barbadense*) is an upland, long-staple cotton that may be used to take the place of Sea Island cotton under boll weevil conditions; 4,000 acres of this variety were grown in Georgia in 1920. The standard length of staple set by the Government is 1½ inches and every effort should be made to maintain this length.—*T. H. McHatton*.

116. WARREN, D. C., and IRA W. WILLIAMS. Cotton dusting experiments of 1920—with recommendations for cotton dusting for coming season. Georgia State Bd. Entomol. Bull. 59. 15 p. 1921.—Dust applied while dew is on plants gives best results. The great fluctuation in cotton prices prevented any definite conclusions as to economic use of dust.—*T. H. McHatton*.

117. WARREN, D. C., and IRA W. WILLIAMS. Results of cotton dusting experiments for 1921 together with summary of the dusting results for past three years—with recommendations for cotton dusting for coming season. Georgia State Bd. Entomol. Bull. 62. 10 p. 1922.—The summary of the 3 years' work in dusting with calcium arsenate against cotton boll weevil show an average gain of 206 pounds of cotton for short staple upland and 159 pounds gain on Sea Island cotton; 100 pounds of cotton pay for the dusting of an acre. Observations also show that the weevils not only get the poison from the dew but in other ways as well. Directions are given for dusting.—*T. H. McHatton*.

118. WESTBROOK, E. C. The tobacco plant bed. Georgia State Coll. Agric. Bull. 222. 8 p. 1920.—The author discusses and describes the preparation, care, and handling of tobacco (*Nicotiana tabacum* L.). Instructions for preparation of soils, use of fertilizers, and setting the plants in the field are also given.—*T. H. McHatton*.

119. WOODWARD, JOHN. Sulphur as a factor in soil fertility. Bot. Gaz. 73: 81-109. 1922.—A summary is given of work on the relation of soil sulphur to productivity. Field experiments were conducted with gypsum in Indiana and Kentucky. Soil analyses were made of soils from Indiana, Kentucky, Michigan, Ohio, and Wisconsin. “The analytical data show a general relation between the sulphur content and loss on ignition in soil samples from the same or closely related soil types, but the relation is not apparent when different soil types are compared. The sulphur contents of the surface soil vary from 0.0118 to 0.0905 per cent. All of the upland soils and most of the alluvial soils are low in sulphur.” The author finds that the highest sulphur content is sufficient for 39 years of alfalfa, 139 of clover, 159 of timothy, 355 of wheat, or 232 of corn. Though not quantitative, the field experiments indicate that tobacco, clover, and alfalfa have been benefited by the use of gypsum.—*B. W. Wells*.

120. ZADE. Die Anerkennung von Klee und Gräsern. [Certification of clover and grasses.] *Mittel. Deutsch. Landw. Ges.* 37: 384-386 1922.—The statement covers the requirements for certifying fields of clover and grasses for seed production.—A. J. Pieters.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 44, 53, 59, 60, 79, 91, 267, 384, 426, 467, 478, 480, 497, 509, 534, 608, 731, 762, 763, 788, 808, 884)

121. ANONYMOUS. A list of one hundred popular books in science. *Jour. Washington [D. C.] Acad. Sci.* 11: 353-356. 1921.—At the request of Geo. F. Bowerman, Librarian of the Public Library of the District of Columbia, a committee of the Academy has compiled a list of scientific books which can be recommended for popular use. The following are of interest to botanists: Darwin, *The Origin of Species*; East and Jones, *Inbreeding and Outbreeding*; Castle, Coulter, Davenport, East, and Tower, *Heredity and Eugenics*; Morgan, *A Critique of the Theory of Evolution*; Conklin, *Heredity and Environment*; Galton, *Hereditary Genius*; Popenoe and Johnson, *Applied Eugenics*; Lotsy, *Evolution by means of Hybridization*; Ganong, *The Living Plant*; Osterhout, *Experiments with Plants*; Soraue, *A Popular Treatise on the Physiology of Plants*; Lubbock, *Flowers, Fruits, and Leaves*; Hardy, *The Geography of Plants*; Darwin, *Insectivorous Plants*; Townsend, *Sand Dunes and Salt Marshes*.—Helen M. Gilkey.

122. ANONYMOUS. Current topics and events. *Nature* 109: 383. 1922.—Rothamsted Station has taken over the Stockyard field, Woburn, held by the Royal Agricultural Society for many years. The Society will continue investigational work on the fields belonging to its members.—O. A. Stevens.

123. ANONYMOUS. Dr. A. B. Rendle. *Gard. Chron.* 70: 256. *Portrait.* 1921.—A brief biographical sketch is presented.—P. L. Ricker.

124. ANONYMOUS. E. H. Jenkins. *Gard. Chron.* 70: 266. *Portrait.* 1921.—E. H. Jenkins, author of *The Rock Garden*, *Hardy Flower Book*, and many articles in the horticultural journals, died Nov. 9, 1921, in his 66th year. A brief sketch of his work is included.—P. L. Ricker.

125. ANONYMOUS. Edwin Molyneux. *Gard. Chron.* 70: 266, 268, 281, 282. 1921.—A biographical sketch is given of Edwin Molyneux (1851–Nov. 12, 1921).—P. L. Ricker.

126. ANONYMOUS. Sir Isaac Bayley Balfour. *Gard. Chron.* 71: 161-162. *Portrait.* 1922.—His retirement as keeper of the Edinburgh Botanical Garden is noted; a brief biographical study is presented.—P. L. Ricker.

127. ANONYMOUS. The British cotton industry research institute. *Nature* 109: 457-458. 2 fig. 1922.—A detailed description with floor plan is given of the recently opened laboratory of the British Cotton Industry Association at the Shirley Institute, Didsbury, Manchester.—O. A. Stevens.

128. ANONYMOUS. The director of Kew. *Gard. Chron.* 71: 85. 1922.—A brief sketch is presented of Sir David Prain on the occasion of his retirement from the Kew directorship, now assumed by A. W. Hill.—P. L. Ricker.

129. ANONYMOUS. The origin of the potato. [Rev. of: HEDRICK, U. P., Editor. *Sturtevant's notes on edible plants.* Rept. New York Agric. Exp. Sta. [Geneva] 1919²: i-vii, 1-686. *Portrait.* 1919 (see Bot. Absts. 8, Entry 862).] *Gard. Chron.* 71: 37. 1922.

130. ANONYMOUS. Thomas Andrew Knight as a pomologist. *Gard. Chron.* 71: 201. 1922.—This is a brief sketch of Knight's work made on the occasion of the award of the Knightian and Hogg medals.—*P. L. Ricker.*

131. ARBER, E. A. NEWELL. Sketch of the history of paleobotany with special reference to the fossil flora of the British coal measures. *Studies Hist. and Method of Sci.* 2: 472-489. *Pl.* 48-55, 1 fig. 1921.—In the prescientific period Lhuyd (Lhuyd or Luidius) (1660-1709) published a catalog describing plant fossils. Woodward (1665-1728) and James Parsons (1705-1770) advocated the flood theory of the origin of plant fossils, even giving the season of the year in which it occurred. Robert Plot (1640-1696), David Ure, and Emanuel Mendes da Costa (1717-1791) further advanced the science. The first binomials were applied by Henry Steinhauer and published in Philadelphia, Pennsylvania, in 1818. Ernst Friedrich Baron von Schlotheim (1764-1830), William Martin (1767-1810), and James Parkinson (d. 1824) belong to this transitional period. The pioneers of the scientific period were interested primarily in taxonomy. Kaspar Maria Graf von Sternberg (1761-1838), Adolphe Theodore Brongniart (1801-1876), Edmund Turell Artis (1789-1847), John Lindley (1799-1865), and William Hutton (1798-1860) published systematic accounts. William Nicol (?1768-1851) first studied sections of petrifications, publishing in 1831-1835. Henry Thomas Mair Witham (1779-1844) also began publication in this field in 1831. The modern period, beginning about 1870, has been more purely botanical in outlook.—*C. W. Dodge.*

132. BAZELEY, MARGARET LEY. The extent of the English forest in the 13th century. *Trans. Roy. Hist. Soc. London* IV, 4: 140-172. 2 maps. 1921.

133. BROTHERSTON, R. P. Donald Beaton. *Gard. Chron.* 71: 196. 1922.—Brief mention is made of his life, work, and writings.—*P. L. Ricker.*

134. BROTHERSTON, R. P. The Antirrhinum. *Gard. Chron.* 70: 248. 1921.—No date of introduction into cultivation has been found; Turner states it was brought from Italy. A few color variations were known in 1578, and it is figured by Parkinson. By 1824 there had been considerable progress in its development. In 1844 a double-flowered variety appeared. Notes are given on cultivation.—*P. L. Ricker.*

135. BROTHERSTON, R. P. The greenhouse, hothouse, and stove. *Gard. Chron.* 71: 78. 1922.—The article, dealing with the above work of Charles McIntosh (b. 1794), includes a brief biographical sketch and notes on plants cultivated during this early period.—*P. L. Ricker.*

136. BROTHERSTON, R. P. The nettle as a food. *Gard. Chron.* 71: 232. 1922.—Three quotations are given from Scotch verse regarding the nettle, together with data as to its former extensive use as a medicine and for human and stock food.—*P. L. Ricker.*

137. BUNYARD, E. A. An early Vilmorin catalogue. *Gard. Chron.* 71: 78. 1922.—Notes are given on an octavo volume of 130 pages published in 1771. This old catalogue includes a list of 22 varieties of strawberries and some flowers as well as a long list of pears.—*P. L. Ricker.*

138. CHIOVENDA, E. Odoardo Beccari. *Nuovo Gior. Bot. Ital.* 28: 5-35. *Portrait.* 1921.—Odoardo Beccari, born Nov. 19, 1843, was educated at R. Collegio di Lucca and at the University at Pisa. After a brief period of study at Kew he joined Doria on an expedition to Borneo (1865-1868). On his return he founded the *Nuovo Giornale di Botanica Italiana*, in 1870 he spent a year in the orient, and joined the D'Albertis expedition to New Guinea (1871-1876) and other parts of the orient (1877-1878). He succeeded Parlatore as director of the museum and botanical garden at Florence (1878-1897). His life was devoted to the study of tropical plants, especially palms. He died Oct. 25, 1920. His biography is followed by an exposition of his biological theories and a bibliography of 10 pages.—*C. W. Dodge.*

139. CORONADO, J. A. *Resumen de mi bibliographia general sobre el café.* [Résumé of my bibliography of coffee.] *Bol. Camara Agric. Costa Rica* 1: 282-288. 1921.

140. [DUDGEON, WINFIELD.] *Indian Botanical Society Bulletin. No. 2.* 8 p. Allahabad. 1921.—A little publication appearing at irregular intervals, intended to promote the interests of the Society. This number contains a plea to make the encouragement of research the primary aim of the Society; and news notes of interest to members. The 1st issue [see Bot. Abs. 8, Entry 846] was not numbered. [See also 2 succeeding entries.]—*Winfield Dudgeon.*

141. [DUDGEON, WINFIELD.] *Indian Botanical Society Bulletin. No. 3.* 10 p. Allahabad. 1922.—A list of members complete to date and the program for the annual meeting at Madras in February, 1922, are given.—*Winfield Dudgeon.*

142. [DUDGEON, WINFIELD.] *Indian Botanical Society Bulletin. No. 4.* 14 p. Allahabad, 1922.—This issue of the bulletin contains a supplementary membership list; a report of the annual meeting at Madras in February, 1922; and plans for carrying on the work of the Society.—*Winfield Dudgeon.*

143. FARSKY, OCT. *Fytopathologická sekce výzkum. ústavu zemědělského v Brně a organisace fytopathologické služby na Moravě, Slezku, Hlučínsku a Valčicku.* [Section for phytopathology in the agricultural experiment station in Brno (Brünn) and organisation of phytopathological work in Moravia, Silesia, Hlučinsko, and Valčicko.] *Ochrana Rostlin* 1: 27, 28, 38-39. 1921.—The agricultural experiment station at Brünn was founded in 1899. A section of phytopathology was established in 1919 but the work did not begin until the winter of 1920. The head of the station is Docent Dr. E. Baudyš. With him are associated 4 scientific investigators (adjuncts), 1 assistant, and 1 laboratory assistant. The work of the section consists of determination and study of diseases, tests of chemicals and apparatus used in control and organization of their production, preparation of calendars and maps of the distribution of diseases, organization for statistical and inspection purposes, and selection of resistant varieties. Interest in phytopathology is stimulated by lectures, field demonstrations, and leaflets.—*E. Baudyš.*

144. FIALON, CHARLES-HENRI. *History of the words "pharmacie" and "apothicaire."* *Amer. Druggist and Pharm. Rec.* 70: 18-19. 1922.—The author traces the words from their Greek origin and shows how they were first used synonymously. "Apothicaire" was finally abandoned, and now only "pharmacist" is given as a title.—*C. M. Sterling.*

145. G[ATES], R. R. [W. B. Bottomley.] *Nature* 109: 524-525. 1922.—W. B. Bottomley was born at Leeds, December 26, 1863, and died March 24, 1922. He was educated at Royal Grammar School, Lancaster, King's College, Cambridge, and at Heidelberg, where he received his Ph. D. degree. A lecturer at St. Mary's Hospital from 1886 to 1891, he was next appointed to the professorship of biology at the Royal Veterinary College, serving also as assistant to Prof. Oliver at University College, London, and as Cambridge University Extension lecturer. From 1893 to 1920 he was professor of botany at King's College, London. His chief interests were with plant nutrition and its relations to agriculture. His most important contribution was the discovery of "auximones," growth-promoting substances which withstand a temperature of 150°C.—*O. A. Stevens.*

146. GUENTHER, FRITZ. *Friedrich Lucas.* *Gartenwelt* 25: 180. 1921.—Friedrich Lucas was born October 30, 1842, in Regensburg, and died August 21, 1921 in Reutlingen. He devoted his life to pomology, writing much on this subject. Until his death he was director of the pomological institute in Reutlingen, Germany.—*J. C. Th. Uphof.*

147. GULICK, ADDISON. *Charles Darwin, the man.* *Sci. Monthly* 15: 132-143. 1922.

148. GUNTHER, R. T. **Early British botanists and their gardens based on unpublished writings of Goodyer, Tradescant and others.** vi + 417 p., 9 pl., 29 fig. University Press: Oxford, 1922. 42 s.—John Goodyer was born at Alton in Hampshire in 1592. For some years he was a steward of Sir Thomas Bilson at West Mapledurham. About 1632 he married and settled at Petersfield, where he died in 1664. He translated Dioscorides and Theophrastus, described many plants, and annotated many of the older herbals. His plant descriptions are printed in full and a careful catalog of his library is given. Many data from the Goodyer papers are given concerning Thomas Penny (1530–1589), a botanist of Oxford and Winchester, (?Walter Bayley 1529–1592), Richard Garth (d. 1597), William (1520?–1600?) and Sir John Salusbury of Llewenni (1567–1612), M. l'Obel (1538–1616), Wm. Mount (1545–1602), Richard Shanne (1561–1627), John Parkinson (1567–1650), Walter Stonehouse (1597–1655), Thomas Johnson (?1600–1644), William How (1619–1656), John Dale (d. 1662), and William Browne (1629–1678). Biographical information of many of their contemporaries appears in footnotes. Garden lists from several of the above as well as from Simon Forman, Lord Salisbury, William Coys Franqueville, John Tradescant the elder, George Gibbs, Edward Morgan, and Robert Morison are given. The work of William Coys on cultivation of yeast and beer making is printed.—The book is well indexed and well illustrated by reproductions from contemporary herbals and by facsimiles of the manuscripts.—C. W. Dodge.

149. J[ATUL], P. A. **Abstraktai iš Musū Botanikos.** [Abstracts from our botanists.] Želmenija 2: 76–78. 1922.—A brief history of Lithuanian botany to the close of the 19th century is followed by 14 short abstracts of agricultural and botanical articles.—C. W. Dodge.

150. JATUL, P. A. **Arnold Arboretum.** Želmenija 2: 73–75. 1922.—A brief historical account of this institution is given with a list of the publications issued by it.—C. W. Dodge.

151. LIVINGSTONE, R. W., Editor. **The legacy of Greece.** 424 p., 36 fig. Clarendon Press: Oxford, 1921.—This is a collection of historical essays, of which those dealing with biology and medicine are by CHARLES SINGER. On the botanical side, attention is directed to the anonymous work on generation (380 B. C.) and later works by Aristotle, Theophrastus, Crateuas (1st century B. C.) Pliny, and Dioscorides.—C. W. Dodge.

152. LYMAN, G. R. **Report of the thirteenth annual meeting of the American Phytopathological Society.** Phytopathology 12: 195–204. 1922.

153. McCALLUM, A. W. **Abstracts of Canadian plant pathological literature.** Quebec Soc. Protection Plants Ann. Rept. 14: 110–115. 1922.—Abstracts of and references to papers published during 1921 are given together with those missed in the previous lists. Some 97 references are included.—B. T. Dickson.

154. MENZIES, DAVID. **Dr. Archibald Menzies.** Gard. Chron. 70: 320, 324. Fig. 143–145. *Portrait.* 1921.—A brief biography and account of his travels and plant introductions are presented.—P. L. Ricker.

155. OBERLY, E. R. **The contribution of librarians to agricultural history and research.** Library Jour. 47: 249–254. 1922.—A brief discussion of the routine work of the reference librarian is followed by an account of the development of library facilities in the U. S. Department of Agriculture. Attention is called to many bibliographies covering a wide range of agricultural subjects.—C. W. Dodge.

156. PARKER, W. H. **The national institute of agricultural botany.** Jour. Ministry Agric. Great Britain 28: 1072–1084. 2 fig. 1922.

157. RICHARDSON, A. D. **The Arniston larches.** Gard. Chron. 71: 259–259. 1922.—No authentic record of date of introduction of the larch into England has been found. The larch

is in Gerard's catalogue of 1596 and not found again until mentioned by Parkinson in 1629. The Arniston Memoirs (1887) indicate that those on the estate were planted in 1738. Other early records of England and Scotland are given.—*P. L. Ricker.*

158. RIEFSTAHL, MEYER R. The pictures of plowing and weaving. *Asia* 20: 1059-1063. 10 fig. 1920; 21: 47-51. 10 fig. 1921.—Notes are given on the editions of a famous Chinese agricultural treatise with reproductions of several illustrations from an 18th (?) century edition.—*C. W. Dodge.*

159. ROBERTS, W. A seedman's broadside. *Gard. Chron.* 71: 54. *Fig. 27.* 1922.—The heading is reproduced of a 1769 seed list of Vilmorin & Co., and a brief early history of the firm is given.—*P. L. Ricker.*

160. ROBERTS, W. The Auricula. *Gard. Chron.* 69: 310. 1921.—One of the earliest accounts of this popular English garden plant is given in John Rea's *Flora* in 1665. Its full popularity was not reached until the 18th century. The names of many early varieties and a sales list of 1756 quoted from a letter to Dr. Richard Richardson from the younger Bobart. A Treatise on the Culture and Management of the Bear's Ear, or *Auricula ursti*, written by "a Florist of nearly 30 years' experience," and printed at Bath, England, in 1782, enumerated 250 varieties. Some were then sold as high as £ 50. Further historical notes down to 1816 are given. [A few corrections and comments on this article are given by C. HARMAN PAYNE, *Gard. Chron.* 70: 21. 1921.].—*P. L. Ricker.*

161. ROPER, I. M. The earliest English herbal. *Somersetshire Archaeol. and Nat. Hist. Soc. Proc.* 67: 65-71. 1922.—A popular paper on the life and work of William Turner (1510-1568), dean of Wells Cathedral, is followed by notes by J. HAMLET which add bibliographical information and call attention to his letters published in *Calendar of State Papers, Domestic, Edward VI* 7: no. 32; 10: no. 34; 11: no. 14; 13: no. 1, 19. 1856.—*C. W. Dodge.*

162. SAVAGE, S. The discovery of some of Jacques Le Moyne's botanical drawings. *Gard. Chron.* 71: 44. 1922.—Notes are given on a collection of 59 excellent water color drawings found at the Victoria and Albert museum, South Kensington. Le Moyne accompanied one of the French expeditions to America as an artist and later settled in London, where he died in 1588. He published a book of wood cuts of animals, birds, and plants in London in 1586.—*P. L. Ricker.*

163. SINGER, CHARLES. Greek biology and its relation to the rise of modern biology. *Studies Hist. and Method of Sci.* 2: 1-101. *Pl. 1-25, fig. 1-43.* 1921.—Greek science has left its conclusions without a hint of the processes of reasoning which led to them. The work of the rhizotomists, Theophrastus and Nicander, the probable author of the *Alexipharmaca* and *Theriaca*, is briefly discussed. More attention is given the work of Crateuas and his tradition in the *Julia Anicia MS.* The Greek codices of Dioscorides and their tradition is carefully discussed. Two schools of botanical illustration are discerned: the Naturalistic, spreading from southern Italy perhaps along with Beneventan script and influence, and the Romanesque, spreading from northern and eastern France. Improvement begins with the *De Vegetabilibus* of Albertus Magnus (1206-1280), compiled from Nicolas of Damascus. The manuscripts and early editions of the *Herbarius* and the *Hortus Sanitatis* are described. The growth of the knowledge of classification, of generation and development, of form and structure, and of habit and distribution is further discussed with quotations from many sources from Theophrastus to the 16th century. The article is well illustrated by reproductions in color from illuminated manuscripts dating from the 5th to the 15th century.—*C. W. Dodge.*

164. SINGER, CHARLES. Steps leading to the first optical apparatus. *Studies Hist. and Method of Sci.* 2: 385-413, 533-534. *Fig. 1-11.* 1921.

165. STRAŇÁK, FR. *Organisace služby rostlino-lékařské v republice Československé.* [Organization of phytopathological work in the republic of Czecho-Slovakia.] *Ochrana Rostlin* 1: 14-15. 1921.—Agricultural institutions are united into "Svaz pro zemědělské a zemědělsko-prumyslové výzkumnictví" (a union for the investigation of agriculture and agricultural industries). In the union there is a commission for phytopathology which is responsible for the organization of phytopathological work in the whole republic. The activity consists of securing information and statistics, publicity, control, and research. Results are collected by central stations at Praha (Prague), Brno (Brünn), Bratislava (Pressburg), and Košice. Besides these stations there are substations in Roudnice, Tabor, and Libverda. Estimates for statistics are made by collaborators named by the minister of agriculture. This work is honorary. Extension work is carried on through lectures, field demonstrations, exhibitions, and publications.—*E. Baudyš.*

166. TAUBENHAUS, J. J. Report of the fourth annual meeting of the Southern Division of the American Phytopathological Society, at Atlanta, Georgia, Feb. 20-22, in connection with the general meeting of the Association of Southern Agricultural Workers. *Phytopathology* 12: 249. 1922.

167. THOMPSON, J. ARTHUR. Science and the farmer. *Jour. Ministry Agric. Great Britain* 29: 217-223. 1922.

168. TRELEASE, SAM F., and EMMA S. YULE. The preparation of theses and other manuscripts. 20 p. College Coöperative Co., Inc.: Los Baños, Laguna, Philippine Islands, 1919.

169. VIELWERTH, VL. *Organisácia rostlinolekárskej služby na Slovensku.* [Organization of phytopathological work in Slovakia.] *Ochrana Rostlin* 1: 9-10. 1921.—Slovakia is divided into eastern and western districts because of difference in agriculture. The work in the western part is carried on by Státní ústav pro zdravotnú ochranu rostlin (state institute for the control of plant diseases) located in Bratislava (Pressburg), and in the eastern part of the state agricultural experiment station in Košice, which has a department for plant pathology.—*E. Baudyš.*

170. WARD, HENRY B. Ansel Augustus Tyler. *Science* 56: 37. 1922.

171. W[HITE], J. W. In memoriam Cedric Bucknall. *Somersetshire Archæol. and Nat. Hist. Soc. Proc.* 67: lxxviii-lxix. 1922.—A musician by profession, Bucknall was well known for his work on *Symphytum*, *Euphrasia*, the fungi of the Bristol district, and other work on the local flora. He died Dec. 12, 1921.—*C. W. Dodge.*

172. WIESEMANN, C. *Kgl. Garteninspektor Carl Friedr. Julius Bouché.* *Gartenwelt* 26: 384. 1922.—Bouché, royal horticultural inspector in Bonn, died June 28, 1922.—*J. C. Th. Uphof.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 63, 121, 143, 337, 347, 423, 452, 453, 458, 471, 477, 608, 731, 732, 733, 734, 892)

173. ANONYMOUS. [Rev. of: COUSINS, H. H. *The chemistry of the garden: a primer for botanists and young gardeners.* R. n. ed., xxii + 147 p. Macmillan and Co.: London, 1921.] *Nature* 109: 443. 1922.

174. ANONYMOUS. [Rev. of: ELFORD, P., and S. HEATON. *Practical school gardening.* 2nd ed., 224 p. Clarendon Press: London, 1921.] *Nature* 109: 514. 1922.

175. DOWDLE, LOIS P., and GEORGE H. FIROR. Instructions for club girls in beans, okra, corn and onion culture. Georgia State Coll. Agric. Bull. 232. 12 p., 7 fig. 1921.

176. GLEISBERG, W. Die höhere Gärtnerlehranstalt. [The institution for higher horticultural education.] Gartenwelt 26: 382-384. 1922.—The writer compares lower, middle, and higher education in horticulture, especially with reference to German conditions. A critical, detailed outline is given of sciences which are adaptable to higher education in horticulture.—J. C. Th. Uphof.

177. LLOYD, F. E., and G. W. SCARTH. An introductory course in general physiology. 8vo., 16 p. Privately printed: Montreal, 1921.—This work includes outlines of laboratory exercises based on extensive experience in teaching, especially the teaching of medical students and is intended as an introduction to modern physiological methods of study in the field covered. Materials and experiments are briefly indicated, the purpose being to put problems before the student. The work assumes the completion of a course in general biology. The materials are chiefly, but not exclusively, botanical. Synopses of the different parts follow: (1) review of biological material (general morphology of living cell), (2) surface tension, (3) colloidal state, (4) hydrogen-ion concentration, (5) diffusion and osmosis, (6) digestion, role of enzymes. Each synopsis is divided into 2 parts; (a) physical phenomena, (b) behaviors in protoplasm more or less susceptible of explanation in the light of (a).—F. E. Lloyd.

178. PICKETT, F. L. The teaching of evolution. Science 56: 298-301. 1922.

179. ROBERTSON, D. W. A course to train specialists in agronomy. Sci. Agric. 2: 328-331. 1922.—The article discusses prerequisites and outlines suggested courses.—B. T. Dickson.

180. WEIGELT, KARL. Rückblick auf die 50 jährige Jubelfeier der Höheren Staatlichen Lehranstalt für Wein-Obst- und Gartenbau zu Geisenheim a. Rhein 1872-1922. [Review of the 50-year jubilee of the State College for Viticulture, Pomology and Horticulture in Geisenheim on the Rhine, 1872-1922. Möllers Deutsch. Gärt. Zeitg. 37: 199-202. 5 fig. 1922.

CYTOLOGY

G. M. SMITH, Editor

(See also in this issue Entries 406, 420, 777)

181. BALLY, WALTHER. Einige Bemerkungen zu den amitotischen Kernteilungen der Chytridineen. [Observations on the amitotic nuclear division of the Chytridineae.] Ber. Deutsch. Bot. Ges. 37: 103-107. Fig. 1. 1919.—This paper is a defense of the author's previously published statements of the occurrence of amitotic division in the primary nucleus of *Synchytrium Taraxaci*. On the basis of a re-examination of his preparations, and a comparison of *Synchytrium* species with *Chrysophlyctis endobiotica*, the author reaffirms the occurrence of the amitotic divisions and denies Rytz's assertions that they are artifacts brought about by the fixing solution.—R. M. Holman.

182. CLELAND, RALPH E. The reduction divisions in the pollen mother cells of *Oenothera franciscana*. Amer. Jour. Bot. 9: 391-413. 3 pl. 1922.—The stages from the resting condition preceding the heterotypic prophase up to the formation of spores are described in detail. Because of the absence of parallelism at all stages and from certain other facts a telosynaptic rather than a parasynaptic interpretation at the spireme is favored. The chromosomes of the last archesporial mitosis are apparently arranged according to a definite plan, so that they come to occupy the same relative position in the subsequent prophase stages. The nucleole seems to store material of some sort, probably chromatin, and is formed anew in each nucleus. This species is very stable genetically and its reduction processes are also very

regular and typical, thus resembling *O. grandiflora* but differing markedly from the less stable species of the genus.—*E. W. Sinnott.*

183. CONN, H. J. **American biological stains compared with those of Grüber.** *Science* 55: 284-285. 1922.—Tests of stains have proved American products to be equal to Grüber stains. Both are found to vary widely.—*C. J. Lyon.*

184. CONN, H. J., and others. **Preliminary report on American biological stains.** *Science* 56: 156-160. 1922.—The committee, organized under the auspices of the National Research Council, reports on the utility of American dyes for bacteriology. They recommend the medicinal quality of methylene blue manufactured by Coleman & Bell Co., National Aniline and Chemical Co., or Providence Chemical Co. For staining bacteria and for use in the Endo medium, satisfactory samples of basic fuchsin, as good as Grüber's dye, were obtained from several companies. Gentian violet includes a variety of dyes and stains. For Gram stain, crystal violet (hexamethyl-pararosanalin) is recommended in place of gentian violet; also for other work unless it be known that crystal violet will not work. Crystal violet can be obtained pure from nearly all dealers. The c. p. haematoxylin prepared by McAndrews & Forbes is generally rebottled by other concerns without change and seems to be the only c. p. product on the market. For eosin, it is unsettled what brands are best. For orange G, the products of several prominent companies appear to be satisfactory; all seem to be more concentrated than the Grüber product. For pyronin, few samples have been tested, but that of Providence Chemical Co. proved satisfactory.—*C. J. Lyon.*

185. DANGEARD, P. A. **Sur la nature du sphérome dans la cellule végétale.** [On the nature of the sphérome in the plant cell.] *Compt. Rend. Acad. Sci. Paris* 173: 1038-1041. 1921.—Dangeard objects to Guilliermond's use of the term sphérome for the ordinary granules which develop during the metabolism of the cell. These granules do not stain when subjected to mitochondrial methods of microtechnique.—*C. H. Farr.*

186. DANGEARD, PIERRE. **Sur l'origine des vacuoles aux dépens de l'aleurone pendant la germination des Graminées.** [On the origin of vacuoles from aleurone during the germination of cereals.] *Compt. Rend. Acad. Sci. Paris* 174: 319-321. 12 fig. 1922.—The aleurone grains or proteoplastids originate from primordia comparable to those of the chloroplasts. The structures giving rise to the aleurone grains in corn, wheat, rice, and oats are figured and described. Aleurone grains are not special plastids, but represent elements of the vacuome, as in *Pinus* and *Ricinus*. Aleurone grains give rise to vacuoles during germination.—*C. H. Farr.*

187. DEVISÉ, RENÉ. **La figure achromatique et la plaque cellulaire dans les microsporocytes du "Larix europaea."** [The achromatic figure and the cell plate in the microsporocytes of *Larix europaea*.] *La Cellule* 32: 247-309. Pl. 4. 1922.—The use of mitochondrial methods in the study of the achromatic figure shows that it is entirely of nuclear origin.—During the winter rest period the nucleus of the microsporocyte is in an advanced prophase stage, and the cytoplasm is homogeneous and contains many chondriocents; the cytoplasmic reticulum observed after Flemming's and other fluids is an artifact, and the droplets associated with it are largely altered chondriosomes. In early spring the chondriocents move endwise toward the nucleus and lay themselves parallel to its membrane, forming a dense "perinuclear chondriosomal mantle." Improper fixation of these structures gives the "radial stage" and "felted stage" of other authors. The chondriosomal mantle remains intact throughout mitosis, its inner boundary marking the limit of the nuclear area. As the nuclear membrane disappears the chromosomes become grouped at the center of the nucleus, the peripheral portion of which is then occupied by a substance representing karyolymph which has been rendered denser, probably through the influence of the cytoplasmic fluid. It is possible that the nucleolar material also plays a rôle here. The spindle arises wholly from this peripheral intranuclear substance, the cytoplasm contributing no formed element. The spindle fibers,

which are no more numerous than the chromosomes, do not invade the nucleus from without; they appear first at the surface of the chromosomes and develop centrifugally until the completed spindle extends across the nuclear region with its poles at the chondriosomal mantle and surrounded on its flanks by the intranuclear substance. The figure is bipolar from the start. Multipolar spindles are artifacts arising through alterations of the chondriosomes and intranuclear substance, as are also the many "mantle fibers" said to surround the spindle proper,—the greater the alteration of the chondriosomes in fixation the more numerous the fibers. The fibers are not such in the strict sense, but are rather lamellae bounding elongated alveolae.—At telophase the terminal portions of the spindle and the remaining intranuclear substance become 2 masses of hyaline fluid in which the chromosomes lie and around which the chondriocents are grouped. The daughter nuclei are reconstituted in these hyaline areas—in substance which is continuous with that of the mother nucleus. The remains of the spindle disappear between the daughter nuclei, no wall forming after the 1st maturation mitosis. The chondriosomes form mantles around the nuclei. The origin and behavior of the achromatic figure in the 2nd mitosis is essentially the same as in the 1st.—Cytokinesis after the 2nd mitosis begins with the formation of a cell plate, which first appears as a delicate layer in the homogeneous material between the spindle fibers. It is not formed by the union of swellings on the fibers; the fibers appear to be wholly passive and show no swellings in well fixed preparations. The cell membrane forms by the deposition of material in the cell plate.—L. W. Sharp.

188. DRAGOIU, J. Influence de la pression osmotique sur la division cellulaire. [The influence of osmotic pressure on cell division.] Compt. Rend. Acad. Sci. Paris 174: 199-202. 1922.—This supplementary report on the effect of hypertonic solutions of 30-50 atmospheres pressure on the mitosis of sea-urchin eggs shows that in some cases the nucleus regains its ability to divide after being returned to normal sea water. In most concentrations, however, there is no recovery after return to sea water.—C. H. Farr.

189. FARR, CLIFFORD H. The meiotic cytokinesis of *Nelumbo*. Amer. Jour. Bot. 9: 296-306. 1 pl., 1 fig. 1922.—In cytokinesis of pollen mother-cells of *Nelumbo lutea* the walls are unequally thickened on various sides of the same cell. There is a succession of division stages from one part of the anther to another though not always from one end to the other. From the comparative abundance of the stages, it is evident that karyokinesis proceeds much more rapidly than does cytokinesis. Eight seems to be the haploid chromosome number. After the heterotypic division, an incomplete and transitory cell plate is formed which disappears in interkinesis; no plate is formed after the homoeotypic division. Following the tetranucleate stage, quadripartition of the cell occurs by furrowing, the furrows being very slender. The spindle fibers now disappear, the walls become thicker, and the microspores round up.—E. W. Sinnott.

190. GEORGEVITCH, PIERRE. L'origine du centrosome et la formation du fuseau chez *Stypocaulon scoparium* (L.) Kutz. [The origin of the centrosomes and the formation of the spindle in *Stypocaulon scoparium*.] Compt. Rend. Acad. Sci. Paris 174: 695-696. 1922.—It is reported that both the centrosome and the spindle arise on the interior of the nucleus. No figures are given.—C. H. Farr.

191. G[OLDSCHMIDT], R. [Rev. of: ABDERHALDEN, EMIL. *Handbuch der Biologischen Arbeitsmethoden*. (Handbook of biological technique.) Urban and Schwarzenberg: Vienna, 1920.] Arch. Zellf. 16: 285. 1922.

192. GUILLIERMOND, A., et G. MANGENOT. Sur la signification de l'appareil réticulaire de Golgi. [On the significance of the reticular apparatus of Golgi.] Compt. Rend. Acad. Sci. Paris 174: 692-694. 1922.—An attempt is made to harmonize the reticulum of Golgi with the canalicules of Holmgren as a modification of the vacuolar system. Descriptions and figures are given of these structures in the meristem of rice roots.—C. H. Farr.

193. KELLER, R. Die electrische Charakteristik der Farbstoffkolloide. [The electrical properties of colloidal dyestuffs.] *Kolloid Zeitschr.* 26: 173-178. 1920.—Solutions of almost all dyestuffs, especially those of animal origin, consist of 2 phases: a colloid phase that obeys the laws of cataphoresis of neutral colloids, and a molecularly dispersed phase with a colored cation. Besides a discussion of the theoretical physical chemistry of these dyes and its experimental basis the author includes some observations on their behavior in plant cells. Most of the simple dyes are anodic in the living plant cell although osmic acid stains fats at the negative pole and Sudan III in alcohol wanders to the cathode. A rule of vital staining is that the dye inside the cell behaves as if it were composed only of its colloidal phase, perhaps due to the adsorption of ions on invisible cell colloids, the migration tendencies of which it shares. The gentian violet-safranin-orange mixture is violet at the anode, yellow-red at the cathode, and stains chromatin violet and cytoplasm yellow-red.—H. E. Pulling.

194. MCFARLAND, F. M. Some simplifications of microscopical technique. *Science* 56: 43-44. 1922.—Acetone is recommended as a substitute for alcohol in hydration and dehydration of mounted sections in passing to and from the stains. Absolute acetone is used in 1 bottle and C. P. acetone in 2 other bottles.—In staining ribbons of sections without removal of paraffine, they are floated upon the surfaces of the stains and distilled water, floated into place upon the surface of an albumenized slide, dried, cleared, and mounted. Sections of the same tissues may thus be stained by different methods and mounted side by side for comparison. The removal of the paraffine is necessary only in case a very narrow diaphragm opening is used.—C. J. Lyon.

195. POLICARD, A., et G. MANGENOT. Action de la température sur le chondriome cellulaire. Un critérium physique des formations mitochondriales. [The effect of temperature on the chondriosomes of cells. A physical criterion for the formation of mitochondria.] *Compt. Rend. Acad. Sci. Paris* 174: 645-647. 1922.—A study is reported of living cells of an alga, *Saprolegnia*, the epidermis of young leaves of *Iris*, and the epidermis of petals of tulip. Between 43 and 50°C. rapid alteration of mitochondria occurs; this alteration is in the nature of a vacuolization. The temperature at which the mitochondria completely disappear has not been definitely determined.—C. H. Farr.

196. RANDOLPH, L. F. Cytology of chlorophyll types of maize. *Bot. Gaz.* 73: 337-374. Pl. 11-18. 1922.—This study of correlation of cell structure with the known genetic behavior of maize involved observations on living and fixed and stained cells of 4 chlorophyll types of maize, namely, "normal green," "Mendelian white," "Mendelian virescent," and "maternal inheritance strain." All contain the same initial cell structure,—bodies, "proplastids," from which chloroplasts develop later. Proplastids are present in every type and have the same size and general appearance in each case. They are rarely more than 1 μ in diameter. Transitional stages in the development of proplastids into chloroplasts are described for the "normal green" type. The green color is not present in the plastids before they are approximately half the size of mature functional plastids. The other chlorophyll types studied are due to the failure of the proplastids to develop into plastids of normal size or color or both. In the "Mendelian white" the proplastids of green plants are like those of the "normal green," while in the white plants the proplastids neither develop rapidly nor ever reach the size of normal chloroplasts. The extreme tip of the albino seedling leaf, however, has a limited region of cells containing green chloroplasts. In "Mendelian virescent," the formation of chloroplasts with their pigment seems to be merely delayed, but when once started continues until the whole plant becomes green. In "Maternal inheritance strain," the green plants are like those of the "normal green" in cytological details. The yellowish green plants show the series of stages in development of chloroplasts, with exception of maximum size, depth of color, and number per cell. The striped plants show to the naked eye a sharp line between green and yellow green; microscopic examination shows a region of transition, 1 to several cells in width, where the plastids of many intermediate sizes and depths of color are visible, even in a single cell.—Green and colorless plastids in the same or in different plants of chlorophyll types are

regarded as the end members of a continuous series which comprises also all intermediate stages in development. The cells of all chlorophyll types contain only 1 kind of primordium from which plastids arise. Differences appearing later are explained as being dependent upon functional rather than structural bases. The mode of origin of the proplastids could not be determined and the question as to whether they are permanent cell organs or may arise *denovo* is still unsettled. Proplastids have a distinct individuality after they are developed into chloroplasts. The relation of proplastids to chondriosomes and like structures is discussed. In maize strains in which the inherited characters are transmitted according to Mendelian rules, the behavior of the proplastids is thought to be at least in part under control of the nuclear mechanism. In strains in which the inheritance is non-Mendelian, no explanation is given.—*Wanda Weniger*.

197. SCHÜRHOFF, P. N. Die Teilung des vegetativen Pollenkerns bei *Eichornia crassipes*. [The division of the vegetative pollen nucleus in *Eichornia crassipes*.] Ber. Deutsch. Bot. Ges. 40: 60-63. Fig. 1. 1922.—Pollen grains almost always degenerate in the binucleate condition. Some, however, show a typical mitosis of the vegetative nucleus. Inasmuch as Smith found that the chromosomes never showed a V-formed figure in the nuclear division of the embryo-sac mother cell, Schürhoff concludes that no reduction division takes place in pollen mother cells and that the plant is ovoapogamous.—*R. M. Holman*.

198. SCHWARZ, CARL A. The method of cleavage in the sporangia of certain fungi. Mycologia 14: 143-172. Pl. 15-16, fig. A-F. 1922.—Cytological study of *Olpidiopsis Saprolegniae*, *Saprolegnia torulosa*, *Achlya*, *Sporodinia grandis*, *Mucor racemosus*, *M. mucedo*, *Circinella minor*, *Rhizopus nigricans*, and *Pilobolus crystallinus* shows that "cell-division in the sporangia of algae and fungi is essentially a process of furrowing either from the periphery of the sporangia or from the vacuoles in the interior of the spore plasm." Spore formation in certain fungi, (*Achlya* and *Saprolegnia*) "involves . . . a marked series of contraction and expansion phases" comparable to the oosphere formation in *Vaucheria* described by other investigators. "The process of spore formation may be much abbreviated, as in *Sporodinia grandis*, . . . or it may be protracted, as in *Pilobolus crystallinus*, . . . by the interpolation of an embryonic stage," the protospores. Columella formation is not initiated by a plane cross-wall but by a "dome-shaped mass of vacuoles at the inner boundary of the spore plasm."—*H. R. Rosen*.

199. SEARS, PAUL BIGELOW. Variations in cytology and gross morphology of *Taraxacum*. I. Cytology of *Taraxacum laevigatum*. Bot. Gaz. 73: 308-325. Pl. 9-10. 1922.—The mode of synaptic pairing and cytological variation in *Taraxacum laevigatum* are discussed. The earliest stages of maturation are marked by the presence of 13 paired prochromosomes. On entering synizesis the thread shows a partly paired, partly vacuolate-split-appearance; on emerging from synizesis it is distributed through the nucleus and a non-simultaneous splitting occurs. The formation of 26 univalent chromosomes occurs by lateral refusion of the 2 previously split halves.—After segmentation, diakinesis in *T. laevigatum* may develop further in any 1 of 4 ways, instead of in a uniform sequence as described for other parthenogenetic species of *Taraxacum*. In 1 sequence pairing is end to end following diakinesis and is prompt and complete, a heterotypic metaphase with 13 bivalents resulting. This almost typical reduction division was observed in pollen, but in the embryo sac it has been traced only through the compact orientation stage. Hundreds of embryo sacs failed to disclose tetrad formation, and it is not known whether true reduction occurs. A 2nd sequence, for which the name "ameiosis" is proposed, results in reproduction in that it insures preservation of constant chromosome equipment in the absence of fertilization. The nuclear membrane disappears before synapsis, synaptic pairing is end to end but takes place very slowly. The pairs, 13 in number, come to metaphase with components still end to end and transversely oriented. A quantitative division is brought about. This sequence occurs in pollen resulting in diads which as a rule do not undergo further growth. In the embryo sac a diad results in which the apical cell disintegrates, the basal cell developing into an 8-nucleate embryo sac by vegetative mitoses. The

3rd sequence found seems to bridge the gap between the 1st and 2nd. Pairing of univalents is variable, and premature elongation of the nucleus and defective orientation occur. This sequence is responsible for pollen abnormalities, the chromosomes never reaching the metaphase position and being reorganized into nuclei before those at the center reach the poles. A 4th sequence of amitosis is also responsible for pollen abnormalities. The nucleus elongates prematurely and the split thread persists after segmentation, giving 26 X- and Y-shaped chromosomes without a spindle.—The 4 sequences following segmentation give a new aspect to the previous hypotheses of maturation in parthenogenetic species of *Taraxacum*. The variations are traced to an increasing degree of inhibition of sex by chromosome individuality and polarity.—Wanda Weniger.

200. SUESSENGUTH, K. **Bemerkungen zur meiotischen und somatischen Kernteilung bei einigen Monokotylen.** [Observations on meiotic and somatic nuclear division in monocotyledons.] *Flora* 114: 313-328. *Fig. 21.* 1921.—In the microsporocyte of *Rhoeo discolor* a continuous double spireme segments into 12 (diploid) split chromosomes, each of which resembles a tetrad because of a transverse constriction. In the heterotypic anaphase 6 of these bodies pass to each pole, and in the homoeotypic mitosis each divides along the plane of the split. Similar appearances are seen in *Thalia dealbata* and *Chamaedorea Karwinskiana*. The behavior of prochromosomes, the frequent pairing of chromosomes in somatic cells, and phenomena in apogamous forms are cited to support the view that somatic and heterotypic mitoses are essentially different in their later stages only. The double spireme of the prophase of both has the same diploid number of split chromosomes placed end-to-end. In somatic mitosis the longitudinal halves of each chromosome separate, so that each telophase nucleus contains 1 portion of every original chromosome. In heterotypic mitosis the halves do not separate, each telophase nucleus containing both portions of $\frac{1}{2}$ the original chromosomes. In both cases the telophase nucleus has the diploid number of daughter chromosomes. Numerical reduction occurs in the homoeotypic division, when the longitudinal halves (daughter chromosomes) finally separate.—L. W. Sharp.

201. SWEZY, OLIVE. **Mitosis in the encysted stages of *Endamoeba coli* (Loesch).** *Univ. California Publ. Zool.* 20: 313-332. *Pl. 29-31.* 1922.—In the encysted *Endamoeba coli* cells, 3 and sometimes 4 successive mitotic divisions occur, resulting in 8 or more nuclei. After fixation the cytoplasm contains much glycogen in the form of 1 or more large masses and a number of slender chromatoid bodies; both represent food reserves used up during the mitoses.—The nucleus has an excentric karyosome and a number of scattered chromatin granules on the linin reticulum and nuclear membrane. The chromosomes are probably 6 in number and split before the spindle is formed. Intranuclear polar masses or centrosomes are formed by division of a part of the karyosome; they remain connected by an intradesmose, and between them the spindle is formed. After the daughter chromosomes separate irregularly the elongated nucleus constricts between the telophase groups and divides into daughter nuclei; the nuclear membrane persists throughout the entire process. There is probably a complete nuclear reconstruction before the next mitosis, the polar mass probably becoming the karyosome, and the chromatin becoming distributed on the linin reticulum and nuclear membrane. The division of the protoplasmic body has not been observed.—L. W. Sharp.

202. TERBY, JEANNE. **La constance du nombre des chromosomes et de leurs dimensions dans le *Butomus umbellatus*.** [The constancy of the number and dimensions of the chromosomes in *Butomus umbellatus*.] *La Cellule* 32: 197-225. *Pl. 2.* 1922.—The chromosomes in the somatic cells are 40 in number and fall into 6 size groups, as follows: group I, 6 chromosomes, 275-325 μ in length; group II, 4 chromosomes, about 200 μ ; group III, 2 chromosomes, 150 μ ; group IV, chromosomes, 100-125 μ ; group V, 20 chromosomes, 75-100 μ ; group VI, 4 chromosomes, about 50 μ . The constancy of such a high number of chromosomes affords further support to the individuality theory, while the constancy of the characteristic dimensions is indicative of qualitative differences among the chromosomes.—L. W. Sharp.

ECOLOGY

H. C. COWLES, *Editor*GEO. D. FULLER, *Assistant Editor*

(See also in this issue Entries 22, 33, 48, 56, 70, 79, 85, 111, 334, 336, 353, 355, 376, 388, 391, 437, 443, 444, 452, 512, 540, 544, 545, 546, 547, 548, 549, 558, 559, 560, 561, 573, 574, 577, 578, 580, 584, 585, 586, 721, 758, 759, 760, 761, 765, 814, 815, 829, 831, 882, 885, 887, 888, 889, 890, 891, 892, 893, 894, 896, 897, 898, 906, 907, 909, 910, 911, 912, 914, 915, 920, 921, 922, 924, 925)

GENERAL, FACTORS, MEASUREMENTS

203. ANONYMOUS. [Climatic maps of Maryland and Delaware.] 1921.—The Maryland State Weather Service in cooperation with the U. S. Weather Bureau, the Johns Hopkins University, and the University of Maryland has published 3 colored maps (each 81.5 × 47 cm.) of Maryland and Delaware. The "Blue" map indicates average annual precipitation, the "Red" map average annual temperature, and the "Green" the growing season or "the average number of days intervening between the date of the last freezing temperature in the spring and the date of first freezing temperature in the fall." For the entire state of Maryland the average annual precipitation is approximately 42 inches with an average annual maximum of 52 and minimum of 34 inches. The average annual temperature is 54°F. with an average annual maximum of 58 and minimum of 46. The average growing season is 185 days with 120 and 230 days as extremes.—*Earl S. Johnston.*

204. ANONYMOUS. Important peat deposit near La Paz (Bolivia). Jour. Amer. Peat Soc. 14: 28. 1921.

205. ADAMS, CHARLES C., G. P. BURNS, T. L. HANKINSON, BARRINGTON MOORE, and NORMAN TAYLOR. Plants and animals of Mount Marcy, New York, Part I. Ecology 1: 71-94. 1920.—In this account of a cooperative study of the timber-line vegetation and the accompanying animal life on Mount Marcy, New York, a general statement of the topographic and geologic relations of the Adirondacks, the climatic conditions of Mount Marcy, and the general aspects of the plant and animal life of the region, is followed by a more detailed account of the instrumental data obtained at 4 stations located at critical points in the vegetative covering of the mountain. The 4 stations chosen were: (a) lower limit of fir forest at 4,250 feet; (b) bog at Tear Lake, at 4,320 feet; (c) dwarf fir forest at 4,890 feet, in the tree crowns and on the ground; and (d) alpine zone above timber line at 4,920 feet. The data concern principally the evaporation, solar radiation, temperature of air, temperature of soil, and analyses of soils at each of these stations.—*Charles A. Shull.*

206. BHIDE, R. K. Drought resisting plants in the Deccan. Jour. Indian Bot. 2: 27-43. 1 pl. 1921.—Unusually severe drought in 1918-19 gave opportunity to study drought resistance in many trees, shrubs, and herbaceous perennials. Available moisture in the soil about the roots (determined by drying the soil to constant weight over a sand bath at 45-50°C.) ranged from 0.8 to 3.5 per cent, depending on the character of the soil. As a result of the severe drought most of the herbaceous plants showed decrease in the length and number of branches, decrease in size, and increase in hairiness of leaves, and, apparently, decrease in number of rootlets. Strong storage tap roots are characteristic of these plants.—*Winfield Dudgeon.*

207. COCKERELL, T. D. A. Natural history of Porto Santo. Nature 107: 10-11. 1921.—This brief description (chiefly zoological) concerns an island of the Madeira group.—*O. A. Stevens.*

208. DUFRÉNOY, JEAN. Influence de la température des eaux thermales de Luchon sur leur flore. [The influence of temperature of the water on the flora of Luchon.] Compt.

Rend. Acad. Sci. Paris 172: 612-614. Fig. 10-14. 1921.—A thermic classification of the waters of Luchon, which are high in sulphur and assimilable iron, corresponds closely to the biological classification according to the mode of symbiosis of the reducing bacteria with the iron and sulphur-oxidizing bacteria. The temperature determines the aspect of the flora.—Filamentous iron bacteria prefer cool and tepid waters; the globular forms (*Siderocapsa*) are ubiquitous and tolerate 43°C. The sulphur-producing types (*Beggiatoa*) live in cool water. *Thiothrix* tolerates 50°C. Only those Thiobacteria of very small diameter endure very hot waters. The formation of sulphur is especially intense between 40 and 50°C., although it is always active.—E. T. Foëx.

209. HELDT, H. Croisière de la Perche en Méditerranée. Détail des opérations. [Cruise of the "Perche" in the Mediterranean. Particulars of the operations.] Bull. Inst. Océanograph. Monaco 389. 15 p. 1921.—Water conditions are given where fish and plankton were collected.—T. C. Frye.

210. LIVINGSTON, BURTON E., and FORREST SHREVE. The distribution of vegetation in the United States, as related to climatic conditions. Carnegie Inst. Washington Publ. 284. xvi + 590 p., 73 pl. (2 colored), 74 fig. 1921.—This book presents studies that occupied the authors for over 10 years, the results being mainly of a quantitative kind. These studies are based on the principle that the control of plant distribution is largely physiological, that all ecological observations must ultimately be expressed in terms of the physiological processes of the individual plants dealt with. The publication constitutes an attempt to correlate the distribution of the vegetation of the areas studied with the distribution of some of the climatic features that seem most important to plants.—Part I is on the distribution of the vegetation, and is illustrated by 33 charts. The 1st of these is a rather detailed map of the vegetation areas of the U. S. A. The areas considered are: (1) California microphyll desert, (2) Great Basin microphyll desert, (3) Texas semi-desert, (4) Arizona succulent desert, (5) Texas succulent desert, (6) Pacific semi-desert, (7) desert-grassland transition, (8) grassland, (9) grassland-deciduous-forest transition, (10) deciduous forest, (11) southeastern evergreen-deciduous transition forest, (12) southeastern mesophytic evergreen forest, (13) northeastern evergreen-deciduous transition forest, (14) northern mesophytic evergreen forest, (15) western xerophytic evergreen forest, (16) northwestern hygrophytic evergreen forest, (17) alpine summits, and (18) swamps and marshes. Plate 1 is followed by a generalized vegetation chart which depicts the vegetation as 9 areas: desert, semi-desert, grassland, grassland-deciduous-forest transition, deciduous forest, northwestern hygrophytic evergreen forest, southeastern mesophytic evergreen forest, northern mesophytic evergreen forest (west), northern mesophytic evergreen forest (east). This chart forms the base for many of the later charts. Plates 2-33 show vegetation features. Three of these present the various degrees of density in the distribution of 3 selected species. Seventy selected species are charted on 23 plates as to the geographical limits of their distributional areas.—Part II deals with the environmental conditions for plant life in the U. S. A. The physiology of conditional control is first somewhat thoroughly presented, after which the main environmental conditions of the U. S. A. are shown by 39 climatic charts, with full tables of data and discussions. Plate 34 deals with the length of the average frostless season. Plates 35 to 45 are charts showing as many different indices of temperature conditions, many of which are derived by new methods. Plates 46-52 deal with precipitation indices, many of which are new. Plates 53-56 present evaporation indices, including those obtained by porous-cup atmometry in 1908. Precipitation-evaporation ratios are presented by the charts of plates 57-62. Two charts (63 and 64) deal with aqueous-vapor pressure and 3 (65-67) with relative air humidity. One chart (68) presents indices of wind velocity and 1 (69) deals with sunshine duration. Moisture-temperature indices are presented by 3 charts (70-72). Plate 73 is a reproduction in colors of Merriam's chart of life zones. Special attention is given to the several temperature and moisture provinces of the U. S. A. and to the charting of the area of this country by means of those 2 criteria.—Part III presents the results of an elaborate attempt to correlate the 32 vegetational charts with the 39 climatic ones. A new kind of quantitative climatic description for each vegetational area is

obtained, these being shown by 130 tables and 53 diagrams. This part of the book represents a very extensive study of the relations holding between the sizes, shapes, and geographic locations of the several vegetational areas and the climatic index values that are shown as belonging to these areas.—*B. E. Livingston.*

211. MOORE, BARRINGTON. The relative length of day and night. *Ecology* 1: 234-237. 1920.—A general review is made of the subject, mentioning a number of contributions to our knowledge of the influence of light upon plant growth and reproduction. Special attention is given to Garner and Allard's work [see *Bot. Absts.* 5, Entry 22], the author pointing out the bearing of their experiments on problems of plant distribution. Suggestions are made for a study of the flowering period of plants in different latitudes, and the author thinks that possibly the same influence has a direct bearing on periodic hibernation and migration of animals.—*Charles A. Shull.*

212. OYE, P. VAN. Influence des facteurs climatiques sur la répartition des épiphytes à la surface des troncs d'arbres à Java. [Influence of climatic factors on the occurrence of epiphytes on the surface of tree-trunks in Java.] *Rev. Gén. Bot.* 33: 161-176. 1921.—The occurrence of epiphytes on tree trunks in the Dutch Indies depends chiefly on light and humidity. For *Trentepohlia* the influence of light is preponderating. The lichens develop where the atmosphere is dry and light. Mosses are found in situations having rather humid atmospheres. *Drymoglossum* was influenced by both light and humidity, usually favoring the south side of the trees. The observations were made at Tasikmalaya, at an altitude of 350-400 m.—*J. C. Gilman.*

213. PEARSON, G. A. Factors controlling the distribution of forest types. Part I. *Ecology* 1: 139-159. 8 fig. 1920.—An account of the factors controlling forest distribution in the San Francisco Mountains of Arizona is given. Five forest associations are considered, the pinon-juniper, yellow pine, Douglas fir, Engelmann spruce, and alpine. The climatic factors discussed are temperature, precipitation, wind, and evaporation. Detailed analyses of the data are presented. The origin and general character of the soil, the available soil moisture, and soil temperatures are the edaphic factors presented.—*Charles A. Shull.*

214. RUSSELL, E. J., and E. H. RICHARDS. The amount and composition of rain falling at Rothamsted. [Based on analyses made by the late Norman H. J. Miller.] *Jour. Agric. Sci.* 9: 309-337. 1919.—Analyses of rainwater for the 10 years 1905 to 1915 are given, with discussion of the data from 1870.—*D. Reddick.*

215. SCHMID, GÜNTHER. *Centaurium pulchellum* (Druce) Sw. auf Bittersalzboden. [*Centaurium pulchellum* in soil rich in magnesium sulphate.] *Ber. Deutsch. Bot. Ges.* 38: 58-68. Fig. 1. 1920.—In the vicinity of Jena below the "Sophienhöhe," gypsum and dolomite are closely associated and as a result magnesium sulphate has been formed. On shallow soil formed by the weathering of rock and containing at least 10 per cent magnesium sulphate in addition to a large quantity of calcium sulphate, the author found a group of somewhat more than 100 dwarf plants of *Centaurium pulchellum* (*Erythraea pulchella* Fries), each with a single flower. The plant, which corresponds closely to the variety *palustre* Schinz et Thellung, has not previously been reported from Thuringia. The author discusses the causes of the rarity in central Europe of areas where the soil is rich in magnesium sulphate. The dimensions of the dwarf plants and their different organs are presented in a table together with corresponding measurements of normal plants found in the same vicinity on soil containing much less of the salt. The normally pentamerous flowers are, in the dwarf plants, for the most part tetramerous; this tendency toward tetramery is more marked in the smaller plants. The small size, absence of branching, production of but 1 flower on a plant, and tendency to tetramery in the dwarf plants are interpreted as expressions of unfavorable conditions for nutrition.—*R. M. Holman.*

216. SEARS, PAUL B. **Vegetation mapping.** *Science* 53: 325-327. 1921.—Two suggestions are here presented. The 1st is a statement of the practical use of a set of symbols to represent genera of plants as transcribed from surveyors' field notes to maps; a workable map results. One concrete instance of its use in the Erie Basin of Ohio is described in some detail.—The 2nd suggestion has to do with the use of the airplane in sketching the various areas of vegetation types. From the airplane these types are distinct and can be comfortably sketched to form the basis of field studies and to serve as a check on final conclusions. The methods were tested in flights made at Arcadia, Florida.—*C. J. Lyon.*

217. SHULL, CHARLES A. **Evaporation in Kansas.** *Trans. Kansas Acad. Sci.* 29: 118-130. *Pl. 1-15.* 1920.—A comparison is made of the evaporation and rainfall at Lawrence and Tribune, Kansas, during parts of 1916 and 1917.—*F. C. Gates.*

218. THOULET, J. **Circulation océanique. Densités in situ et indices de réfraction.** [Oceanic circulation. Densities in situ and indices of refraction.] *Bull. Inst. Oceanograph. Monaco* 394. 26 p. 1921.

219. THOULET, M. J. **Sur la mesure directe des courants marins superficiels et profonds.** [On the direct measurement of surface and deep marine currents.] *Bull. Inst. Oceanograph. Monaco* 393. 4 p. 1921.

220. VAURABOURG, C. **La détermination de la densité de l'eau de mer par la mesure de l'indice de réfraction.** [The determination of the density of sea water by the measure of the index of refraction.] *Bull. Inst. Oceanograph. Monaco* 395. 27-47. 1921.

221. WHERRY, EDGAR T. **Soil acidity and a field method for its measurement.** *Ecology* 1: 160-173. 1920.—The author discusses the ways in which hydrogen ions may be produced in soils, a method of recognizing the cause of soil acidity, and describes the process of making indicator field tests for soil acidity. A color chart is included.—*Charles A. Shull.*

STRUCTURE, BEHAVIOR, SYMBIOSIS

222. ANONYMOUS. **Floral fireworks.** *Sci. Amer. Monthly* 3: 120. 1 fig. 1921.—A brief account is given of some of the methods of spore and seed distribution.—*Chas. H. Otis.*

223. BAILEY, IRVING W. **Some relations between ants and fungi.** *Ecology* 1: 174-189. 3 pl. 1920.—A number of species of myrmecophytes have been studied with special reference to the relations existing between the fungi found growing in the cavities inhabited by the ants, and the ants themselves. The growth and sporadic distribution of the fungi suggest that they are adventitious rather than cultivated by the ants. Investigation of the pellets found in the infrabuccal cavities of the worker ants showed that there is a general tendency among ants to take spores and fragments of mycelia into these cavities. The author believes that this infrabuccal sac serves mainly as a receptacle for food-residues and detritus rather than as a receptacle for food. The spores and fungi found in the cavity may be looked upon as detritus since the crops and stomachs of the ants never show spores or fragments of hyphae among their contents. While the ants are closely associated with fungi, the data presented do not indicate that the Formicidae other than the Attii, are fungivorous. The pure cultures of fungi often found in such ant homes may be the result of natural selection permitting one form to become dominant, after which it is transferred to new nests by the queens. The Formicidae are probably active agents in disseminating fungi, especially in the tropics. There is a brief discussion of the origin of fungus-growing and fungus-feeding habits of ants.—*Charles A. Shull.*

224. BUTLER, H. **Dendrobium linguiforme.** *Australian Nat.* 4: 207. 1921.—The structure of its leaf is regarded as explaining its xerophytic habitat.—*T. C. Frye.*

225. BUTLER, H. *Erythrina indica*. Australian Nat. 4: 206. 1921.—It is suggested that the species does not fruit in the vicinity of Sydney because a species of bird extracts the nectar by perforating the base of the flower.—T. C. Frye.

226. FORREST, GEORGE. A lecture on recent discoveries of rhododendrons in China. Rhododendron Soc. Notes 2: 3-23. 1920 [1921].—The author, who has spent 10 years in the botanical exploration of southwestern China, gives an account of his discoveries as they concern the genus *Rhododendron*. Introductory remarks on the topography and geology of the region are followed by notes on the environment, the habit, the flowers, and other obvious characters of a large number of species, many of them shown by lantern-slides in the course of the lecture. After the conclusion of the lecture I. B. BALFOUR made some remarks on the phylogenetic development of the genus and attributed its remarkable segregation in that region chiefly to the diversified climatic conditions. He further spoke on the relationship of the rhododendrons of these regions to lime in the soil and particularly on the important discovery of Forrest that the nitrogen-supplying mycorrhiza, which does not flourish in limestone soil, is replaced by a mycophyllon, —a fungus mycelium growing on the under side of the leaves and probably absorbing free nitrogen from the atmosphere and making it available to the rhododendron.—Alfred Rehder.

227. FORSAITH, C. C. Anatomical reduction in some alpine plants. Ecology 1: 124-134. 1920.—A study of the anatomy of *Betula glandulosa* Michx., *B. alba* var. *cordifolia* (Regel) Fernald, *Alnus crispa* (Ait.) Pursh, and *Rhododendron lapponicum* (L.) Wahlenb. from near timberline on the Presidential Range in New Hampshire, as compared with the anatomy of allied species from lower elevations, reveals a marked reduction of the medullary ray storage tissue in the alpine forms. In *Betula* and *Alnus* the rays are usually reduced to a uniseriate condition, and the compound rays of *Rhododendron* are markedly reduced. The reduction is believed due to the alpine climate. As the general trend of evolution of anatomy in these genera appears to be toward simplified rays, the notable reduction in alpine species seems to indicate that the severe conditions of alpine life cause a more rapid phylogenetic progress than occurs in sheltered lowland species.—Charles A. Shull.

228. GOOR, A. C. J. VAN. Das Wachstum der *Zostera marina* L. [The growth of *Zostera marina*.] Ber. Deutsch. Bot. Ges. 38: 187-192. 1920.—The author presents measurements, taken at 7 stations in the Watten Sea along the Dutch Coast over a period of 15 months, of minimum, maximum, and mean leaf width and length of the longest leaves of a large number of *Zostera* plants, of which the mean number of leaves is also given. The increase in leaf number by the development of new leaves, the decrease through dying off of old leaves, the growth of the new leaves in length and width, and the relation of these changes to the seasons of the year are discussed.—R. M. Holman.

229. HARRISON, J. W. HESLOP. The colors of primroses. Nature 107: 359-360. 1921.—Red-flowered forms transferred from one locality at 1,500 feet elevation to near sea-level produced red flowers the 1st year, but normal yellow ones thereafter. From another station at 1,000 feet the red was retained. Among hundreds of primrose-cowslip hybrids the author has never seen similar plants. The pollinating insect is *Bombyllus major*.—O. A. Stevens.

230. HAVILAND, F. E. Some notes on *Kochia villosa*, Lind.: var. *tenuifolia*, F. v. M. Australian Nat. 4: 205-206. 1920.—Foliage and pollination are discussed from an ecological point of view.—T. C. Frye.

231. KLUGH, A. BROOKER. Nature's diary. Farmer's Advocate 56: 648. 1921.—*Hepatica* does not secrete nectar, but insects visit the flowers to obtain pollen.—F. W. L. Sladen.

232. LOWE, H. J. Bees and scarlet runner beans. Nature 107: 684. 1921.—The writer has previously reported [Nature 105: 742. 1920] bumble bees regularly puncturing the base of

the flower to obtain the nectar. In 1921 they did not. He suggests that the dry season has decreased the depth of the flower and perhaps hardened the calyx, making it more difficult to penetrate.—O. A. Stevens.

233. PERRYCOSTE, F. H. The colors of primroses. *Nature* 107: 459. 1921.—On the island of Sark an abundance of white, pink, and red primroses occur. Red could not have been due to altitude.—O. A. Stevens.

VEGETATION

234. ADAMS, CHARLES C., GEORGE P. BURNS, T. L. HANKINSON, BARRINGTON MOORE, and NORMAN TAYLOR. Plants and animals of Mount Marcy, New York. Part II. *Ecology* 1: 204-233. 6 fig. 1920.—Part II of this paper deals with the ecological relationships of the animals and plants of Mount Marcy. The fir forest is continuous over the slopes of Mount Marcy except for a bog at Tear Lake and the alpine summit. Conditions at the lower limit of the fir forest (4,250 feet) are described, with a list of plants in order of frequency. The vertebrate fauna, especially the birds, is listed and conditions favorable for animal life are discussed. The conditions at Tear Lake, the source of the Hudson River, are presented in detail, many plants and invertebrate animals being listed. The dwarf fir forest just below timber line (4,890 feet) is marked off abruptly from the alpine fell-field, and at timber line the trees are 7-12 feet tall. The undergrowth is made up mainly of mosses, with *Oxalis acetosella* and a few other herbs among them. The forest is so dense that no true alpine plants penetrate through the timber-line barrier. Some invertebrates are mentioned from this forest, and a number of birds, with the plants that yield them food. The alpine zone receives major consideration. The succession is traced from the pioneer lichens to the climax vegetation of the alpine summit. A description is given of a dwarf birch meadow in which lowland species have pushed into the alpine zone. Another meadow on the south east side of the mountain (5,100 feet) shows a remarkable intrusion of lowland species into the alpine region. Invasion from above downward is found only at Tear Lake, but lowland species do not similarly find timber line a barrier to their distribution.—Charles A. Skull.

235. ANNANDALE, N., and H. G. CARTER. Notes on the vegetation of Seistan. *Jour. Asiatic Soc. Bengal* 16: 267-297. Pl. 4. 1919.—Plants collected at Seistan on the Persian frontier of Afghanistan and Baluchistan are listed, with an ecological discussion of the various types of vegetation observed: the stony desert, banks of saline streams, alluvium, sand dunes, etc.—E. D. Merrill.

236. ASTRE, GASTON. Contribution à l'étude de la répartition des zones biologiques sur les dunes méditerranéennes du golfe du Lion. [Contribution to the study of the distribution of the biological zones of the Mediterranean dunes of the Gulf of Lyons.] *Compt. Rend. Acad. Sci. Paris* 172: 1120-1123. 1921.—The author replies to a recent paper by Kühnholtz-Lordat [see Bot. Absts. 12, Entry 240]. The region is divided into 4 zones according to the general classification of dune areas made by the author, namely: abiotic, oligobiotic, mesobiotic, and pleistobiotic. The 1st is free from plants; the 2nd is characterized by *Ammophila arenaria* almost exclusively; the mesobiotic has in addition *Teucrium* and *Ephedra*; and the pleistobiotic is characterized by the presence of many plants.—C. H. Farr.

237. DWYER, J. W. A floral survey of the southwestern slopes of N. S. Wales round about Temora and Barmedman. *Australian Nat.* 4: 212-224. 1921.—A list of the plants by families is given with some remarks on their habitats.—T. C. Frye.

238. HAMILTON, A. A. An ecological study of the saltmarsh vegetation in the Port Jackson District. *Proc. Linn. Soc. New South Wales* 44: 463-513. Pl. 17-30. 1919 [1920].—A critical survey, based on detailed observations of the behavior of the vegetation of a definite area is given. The flora shows representative, successful, xerophytic modifications such as succulence, special breathing organs, glossy leaf surfaces, or reduced, cutinised, or vertically set leaves, shallow rooting, or massed arrangement, as means for resisting the principal factors

considered, namely; salinity of soil, intense insolation, imperfect drainage, and tidal and stream movements. The manner of formation of the marshes, their zonation, the means of seed distribution, the different groups of plants represented, their succession, and the part each plays in land formation are described. The scarcity of mosses and of rosette- and bulb-forming species, and the lack of bright colored flowers (associated with the wind pollination—found chiefly—instead of insect pollination) and fruits were noted in contrast with the bright flowered xerophytes of the sandstone hills. Red, as compared with green, *Salicornia* stems were present in all tufts and at all seasons but were least so in summer. The danger of mistaking the ecologic responses of a species for different species or varieties is pointed out. The formations discussed were (1) tide-flood zone, (2) a dry salt plain, and (3) fluvial zone.—*Eloise Gerry.*

239. HARPER, ROLAND M. The limestone prairies of Wilcox Co., Alabama. *Ecology* 1: 198-203. # fig. 1920.—A general discussion of the limestone soils of Wilcox county is accompanied by a list of the commonest species of plants found in the natural prairies.—*Charles A. Shull.*

240. KÜHNHOLTZ-LORDAT, G. Phytogéographie dynamique des dunes du golfe du Lion. [Dynamic plant-geography of the dunes of the Gulf of Lyons.] *Compt. Rend. Acad. Sci. Paris* 172: 865-868. 1921.—The dunes are rarely 60 m. wide and a maximum of 8 m. high. A triple dynamic action of wind, sand, and obstacles is involved. Plants, especially *Ammophila arenaria*, are concerned in the building of the dunes, and *Teucrium Polium* and *Ephedra distachya* are especially involved in conserving them. [See also *Bot. Absts.* 12, Entry 236.]—*C. H. Farr.*

241. MALTA, N. Oekologische und floristische Studien über Granitblockmoose in Lettland. [Ecologic-floristic studies of the mosses of granitic erratics in Latvia.] *Latvijas Augstskolas Raksti* [Acta Univ. Latviensis] 1: 108-124. 1921.—This article deals with mosses of Livonia and Kurland. Granitic erratics are interesting floristically because of the presence of montane species in the lowlands; ecologically, in the small, restricted, and unvarying character of the substratum they furnish, permitting easy recognition of the influence of climatic and other factors as well as facilitating study of changes in conditions produced by layers of humus, soil, shade, and moisture. Even very thin layers of humus cause such erratics to lose completely their distinctive character, hence care is necessary to distinguish the genuine granitic flora from that which has overrun the blocks.—In dry, sunny situations free from disturbance by men or cattle, the moss cover of granite blocks changes but little in the course of many years, even when the plant covering of the surrounding soil is greatly altered. Colonization of bare blocks proceeds from scattered plants finding lodgment in dust-filled depressions; speed is correlated with roughness of surface; lichens preceded mosses on smooth rocks. Various species of Grimmiaceae form the most conspicuous association covering rocks in open, sunny places; a 2nd well-defined association occurs on blocks in the shade of bushes; a 3rd, in the deeper shade of woods. The moisture factor is closely related to that of shade, but there is a well-defined hygrophytic association independent of the shade. Lists of species for each association are given. The article closes with an annotated list of 13 hepatics and 96 mosses which occur on granitic erratic blocks. A bibliography of 10 titles follows.—*E. B. Chamberlain.*

242. METCALF, Z. P. Some ecological aspects of the tidal zone of the North Carolina coast. *Ecology* 1: 193-197. 1920.—The paper deals principally with animals, but reference is made to several unnamed species of grasses and to *Uniola paniculata*, which occur on the tidal zone of the North Carolina coast.—*Charles A. Shull.*

243. NEEDHAM, J. G. A biological examination of Lake George, N. Y. *Sci. Monthly* 12: 434-438. 1921.—The water is "soft," and the dominant plants and lesser animals differ from those in other lakes in central New York. The most abundant plant is *Nitella opaca*, occurring at depths between 18 and 45 feet and covering scores, if not hundreds, of acres of the lake bed;

it is often 3-4 feet long, and is called grass locally. *N. batrachosperma* (at 5-foot depths) and 2 species of *Chara* are also present. Below the *Nitella* zone is the abundant siphon alga, *Dichotomosiphon*, at 40-50-foot depths. *Cladophora* is in the deep, dark areas. On the shore, *Tolypothrix* fairly covers the submerged stones. *Elodea* and hornwort are scarce. *Potamogeton proslongus* forms the most beautiful weed beds of the lake at 10-15 feet. Four genera of diatoms and other less abundant algae were found. Certain especially favorable collecting grounds are noted as are the small animals associated with certain plants.—*L. Pace*.

244. PEATTIE, DONALD C. An interesting habitat. *Rhodora* 23: 69-71. 1921.—A description is given of the flora and the habitat of an association for which the author proposes the name "Grotto," because of its resemblance to that physiographic feature. This habitat consists in a face or precipice of rock with frequently a sloping shelf below, and a continual seepage of water down the upper rock on to the lower. Owing to this seepage it is essentially a hydrophytic habitat yet an aerial one. An association of this type is detailed as it occurs in the Blue Ridge in North Carolina, and its annual cycle is described.—*James P. Poole*.

245. SOPER, J. DEWEY. Notes on the mammals of Ridout, District of Sudbury, Ontario. *Canadian Field Nat.* 34: 61. 1920.—The habitats of the local forest trees are briefly described.—*W. H. Emig*.

FLORISTICS

246. ANONYMOUS. Exhibit of National Herbarium specimens. *Proc. Linn. Soc. New South Wales* 45: 318-319. 1920.—*Eupatorium glandulosum* H. B. & K. and *Crepis setosa* Hall. were exhibited. The 1st is a native of Mexico, a garden escape, which has become well established in certain localities at sea level. The 2nd is a native of Europe and Asia Minor recorded for the 1st time in Australia. A seed of *Butia yatay* Becc. (*Cocos yatay* Mart.) which produced twin seedlings was exhibited. References to other cases of polyembryony are given.—*Eloise Gerry*.

247. BENNETT, ARTHUR. *Silene conica* L. in Carmarthenshire. *Jour. Botany* 59: 205-206. 1921.

248. CALVERT, E. W. Notes on the fauna and flora of East and Middle Sister and North Harbor Islands, Lake Erie. *Canadian Field Nat.* 34: 109-110. 1920.—A few of the more common trees are mentioned.—*W. H. Emig*.

249. COBAU, R. Flora vasculare spontanea della città di Milano. [Flora of vascular plants of Milan.] *Nuova Gior. Bot. Ital.* 27: 89-128. 1920.

250. CULMANN, P. Muscinées spéciales à l'Auvergne. [Bryophytes peculiar to the Auvergne.] *Rev. Bryologique* 47: 65-69. 1920.—According to Héribaud there are 32 species of bryophytes, 13 hepatics and 19 mosses, which are restricted in France to the region of the Auvergne. The author shows that these numbers are much too high. On the basis of citations from the literature he is able to reduce them materially and expresses the opinion that the total number will hardly exceed half a dozen when the distribution of the bryophytes in France is more completely known.—*A. W. Evans*.

251. DESMIER, M. G. *Stereodon Haldani* Lindberg et *Allcularia compressa* (Hooker) Nees: deux nouveautés bryologiques pour la flore vosgienne. [Stereodon Haldani and Allcularia compressa, two bryophytes new to the Vosges Mountains.] *Bull. Soc. Bot. France* 66: 371-373. 1919.

252. DESPARTY, M. M. Nouvelles localités de plantes observées dans les cantons de Corbell-Sud, de Milly-Nord (Seine-et-Oise) et de Melleu-Ouest (Seine-et-Marne). [New stations of plants found in the cantons of South Corbell, North Milly (Seine-et-Oise) and West

Melun (Seine-et-Marne).] Bull. Soc. Bot. France 66: 334-338. 1919.—In this 2nd list 55 genera and 66 species are named.—A. Gershoy.

253. D[UNN], S. T. [Rev. of: GAMBLE, J. S. **The flora of Madras, III.** Kew Bull. 1920: 49-57. 1920 (see Bot. Absts. 7, Entry 2202).] Kew Bull. 1920: 75. 1920.

254. FARRER, REGINALD. **Second expedition in Asia. (Cont.) The Akhyang Valley.** Gard. Chron. 69: 162. Fig. 70. 1921.—A narration of the expedition is given with brief descriptions of the most interesting and attractive vegetation encountered. Earlier articles, published in 1919, 1920, and 1921, are listed.—P. L. Ricker.

255. FISCHER, C. E. C. **Miscellaneous notes.** Jour. Indian Bot. 2: 57-58. 1921.—New localities are recorded in peninsular India for *Pyrenacantha volubilis* Hook. and *Scoparia dulcis* L.—Winfield Dudgeon.

256. FLEISCHER, M. [Rev. of: MALTA, N. **Beiträge zur Moosflora des Gouvernements Pleskau mit besonderer Berücksichtigung des Kalksteingebietes der Velikaia mündung.** (Contributions to the moss flora of the Government Pskov, with special reference to the limestone region at the mouth of the Velikaia River.) 78 p., 12 fig. Riga, 1919 (see Bot. Absts. 8, Entry 453).] Hedwigia 52: (Beiblatt) 30, 31. 1920.—The reviewer is inclined to confirm the author's statement that *Mnium hornum*, *Aulacomnium androgynum*, and *Grimmia pulvinata* reach their eastern limit in the Velikaia region and adds that *Pseudoscleropodium (Hypnum) purum* has a similar eastern limit.—A. W. Evans.

257. F[YSON], P. F. [Rev. of: HITCHCOCK, A. S. **Floral aspects of the Hawaiian Islands.** Ann. Rept. Smithsonian Inst. 1917: 449. 1919.] Jour. Indian Bot. 2: 152-153. 1921.

258. F[YSON], P. F. [Rev. of: WILSON, E. H. **Notes from Australasia No. 1.** Jour. Arnold Arboretum 2: 160-163. 1921.] Jour. Indian Bot. 2: 153-154. 1921.

259. HANSON, HERBERT C. **Distribution of the Malvaceae in southern and western Texas.** Amer. Jour. Bot. 8: 192-206. Fig. 1. 1921.—The geographical and ecological distribution of the Malvaceae in southeastern and in western Texas was studied; 66 species were found, 32 in the semi-tropical Gulf Strip, 4 in a small area of the Austroriparian, 35 in the Lower Sonoran, and 22 in the Upper Sonoran. Semi-tropical species of limited distribution are: *Bastardia viscosa*, *Malachra capitata*, *Abutilon pedunculare*, *A. jacquini*, *A. triquetrum*, *Wisadula periplocifolia*, and *Cienfuegosia sulphurea*. Western species of decidedly xerophytic type are: *Disella* spp., *Sphaeralcea* spp., *Sida* spp., *Abutilon malacum*, *Hibiscus denudatus* var. *involutellatus*, *H. Coulteri*, *Malvastrum coccineum*, and *M. elatum*. Eastern mesophytic species are: *Hibiscus lasiocarpus*, *H. militaris*, and *Kosteletzkya althaeifolia*. Species of very wide distribution are: *Callirhoe involucrata*, *Malvastrum americanum*, *Malva parviflora*, *Sida diffusa*, *S. spinosa*, *S. hastata*, *Abutilon incanum*, and *Malvastrum Drummondii*.—E. W. Sennott.

260. KASHYAP, SHIV RAM. **Notes on the distribution of liverworts in the western Himalayas, Ladak and Kashmir.** Jour. Indian Bot. 2: 80-83. 1921.—Fourteen species were found in Jammu State, the surprisingly small number of 5 in the Kashmir Valley, and only 2 beyond the Himalayas north of Kashmir Valley. These observations bear out the previous conclusion of the author that in the Himalayas the number of species and individuals of liverworts decrease (1) in passing from east to west, (2) from south to north, and (3) from lower to higher altitudes.—Winfield Dudgeon.

261. MOUSLEY, H. **Further notes on the orchids of Hatley, Stanstead County, Quebec, 1920.** Canadian Field Nat. 34: 169-173. 1920.—Three additional species of orchids were found in the vicinity of Hatley. This brings the total number of species in this region to 33.—W. H. Emig.

262. PALMER, ERNEST J. *Botanical reconnaissance of southern Illinois*. Jour. Arnold Arboretum 2: 129-153. 1921.—The author states that the flora of southern Illinois contains many elements of the flora of the Gulf Coastal Plain, which extends at this point farther north than anywhere else in the continental interior. This fact is explained by the extension of the embayment of the Gulf of Mexico northward to southern Illinois up to the end of the Tertiary period and even later. The uplift of the Ozark plateau and the obliteration of the embayment caused great changes in the vegetation, but part of the original flora persisted in favorable localities. The plant associations of the different geological formations are given and the prominent species enumerated. A list of the ligneous plants observed with notes on their distribution, habitat, and habit concludes the article.—*Alfred Rehder*.

263. POTIER DE LA VARDE, R. *Bartramia stricta* Brid. sur le littoral de la Manche. [Bartramia stricta on the coast of the Manche.] Rev. Bryologique 47: 73. 1920.—The author reports his discovery of *Bartramia stricta* at St-Jean-le-Thomas, in the department of the Manche, France. The species is predominantly southern in its distribution, and its occurrence so far north is attributed to unusually favorable environmental conditions.—*A. W. Evans*.

264. RIDDELSDELL, H. J. *Draba muralis* in Gloucestershire. Jour. Botany 59: 180. 1921.

265. RÖLL, JULIUS. Dritter Beitrag zur Torfmoosflora der Rhön. [Third contribution to the peat moss flora of the Rhön.] Hedwigia 62: 155-162. 1921.—The present report is based largely on explorations made by the author during the summer of 1919 in the Rhön Mountains of Germany. The bogs of the region show few peculiar species, but the presence of *Sphagnum fuscum*, *S. Wilsoni*, and *S. tenellum* is emphasized and attention is called to the absence of certain species, especially members of the *Subsecunda* group. In all, 28 species of *Sphagnum* are enumerated, many of which are represented by several varieties and forms. Definite localities are noted in each case.—*A. W. Evans*.

266. TAYLOR, WM. RANDOLPH. Additions to the flora of Mount Desert, Maine. Rhodora 23: 65-68. 1921.—A list is given of species collected by Macfarlane and the author in 1915 and by the latter in 1920. The list includes algae, bryophytes, and angiosperms. In some cases the localities are given and in others only the data as to abundance.—*James P. Poole*.

267. TÖLG, F. Eine naturwissenschaftliche Studienreise in das Amanos-Gebirge (Alman Dag). [A scientific expedition in the Amanos mountain range.] Arch. Naturgesch. Abt. A. 85: 88-130. Fig. 1-11. 1919 [1920].—Observations, made on a journey during the spring and summer of 1914 in eastern Asia Minor, are recounted. These deal in large part with the flora, native and cultivated. The notes of the author, since deceased (April 8, 1917), have been edited with a foreword by JOSEF FAHRINGER. A bibliography of 28 titles is appended.—*C. E. Allen*.

268. UGOLINI, U. Contributo alla flora del Tirole Cisalpino. [Contribution to the knowledge of the flora of cisalpine Tyrol.] Nuova Gior. Bot. Ital. 27: 251-261. 1920.

269. VIGNOLE-LUTANI, F. Contributo alla flora del circondario di Alba. [Contribution to the knowledge of the flora about Alba.] Nuova Gior. Bot. Ital. 27: 208-322. 1920.—A list is given of names and stations of the plants collected and the significance noted of the occurrence of some of these in the study of plant distribution.—*Ernst Arschwager*.

270. WARD, F. KINGDOM. The distribution of floras in S. E. Asia as affected by the Burma-Yunnan Ranges. Jour. Indian Bot. 2: 20-26. 1 map, 2 pl. 1921.—The Burma-Yunnan Ranges are a southerly-extending arc of mountains at the eastern end of the Himalayas and the western end of the West China mountains, forming the divide between the Salween and the Brahmaputra and Irrawaddy Rivers. This paper refers especially to the flora of the

southern end of the Ranges (26° N. lat., 98° 30' E. long.). The entire region is forested, and may be divided into: (1) Jungle, up to 5,000 feet, composed almost entirely of Indo-Malayan forms (*Dipterocarpus*, *Shorea*, *Hiptage*, *Elaeocarpus*, *Engelhardtia*, *Garcinia*, *Caryota*, *Calamus*, and *Ficus*, with many epiphytes, lianas, and tree ferns. (2) Temperate rain forest, 5,000–8,000 feet containing many large trees (*Schima*, *Gordonia*, *Bucklandia*, *Quercus*, *Magnolia*, *Acer*, and *Rhododendron*, an abundance of epiphytes, small herbs, and moss, few lianas, and a moderate undergrowth, mainly bamboo. (3) Conifer forest, 8,000–12,000 feet, with *Abies*, *Rhododendron emuldrum*, and bamboos dominant; a few other conifers appear locally; there are many shrubs and few lianas. Alpine meadows are occasionally met with at 9,000–11,000 feet. (4) An alpine belt.—These Ranges are specially rich in Ericaceae, there being more than 50 species of *Rhododendron* alone.—The flora is a mixture of Indo-Malayan, Himalayan, Chinese, and endemics. The Indo-Malayan element preponderates at lower altitudes and up the river valleys, but fades out eastward in Yunnan. In modified form it extends eastward in a belt along the coast of China almost to the Yangtze. The Himalayan element is well represented at intermediate levels, less so at high levels. The Chinese elements are derived from 2 distinct sources: (1) from the higher ranges of western China, and confined to higher altitudes; and (2) from a curious "Burma-Yunnan" flora, rich in endemics, and restricted to the area lying between the Salween River valley, about 26° N. lat., and the eastern end of the Himalayas.—The author concludes that "the N. E. Frontier belt, and more especially the Mekong-Salween divide, is primarily a barrier, botanical and zoological, marking the eastern limit of the Indo-Malayan, or Oriental region, for at least 750 miles. Secondly it is, or has been, connected in the north with the Himalayan ranges on the one hand, and with the great China divide on the other, serving both to keep them apart and to link them up to a common centre."—Winfield Dudgeon.

271. WILSON, E. H. Notes from Australasia. I. Jour. Arnold Arboretum 2: 160–163. 1921.—The author speaks of his first impression of the peculiar character of the Australian flora, describes the forest vegetation of Western Australia, and mentions the most important forest trees, chiefly *Eucalyptus*.—Alfred Rehder.

APPLIED ECOLOGY

272. ANONYMOUS. A serious mis-statement. Amer. Bee Jour. 61: 64. 1921.—An erroneous report, that grapes are valuable as a source of honey, is refuted.—J. H. Lovell.

273. ANONYMOUS. Honey from city shade trees. Amer. Bee Jour. 61: 149–150. 1921.—In the city of Washington there are 10,000 basswood trees within a radius of 2 miles from Iowa Circle. A beekeeper, who moves his bees into the city, gets an average of about 35 pounds per colony of basswood honey. The moving of bees to the city is a novel idea.—J. H. Lovell.

274. ANONYMOUS. The beekeeping industry of Florida. Beekeepers' Item 5: 13–14. 1921.—With better beekeeping methods and the eradication of bee diseases the outlook for beekeeping in Florida is very promising. Probably nowhere in the U. S. A. is there so large a number of colonies of bees within so small an area as in the tupelo swamps along the Apalachicola River. The north central portion of the state contains extensive areas of gallberry (*Ilex glabra*). In the central and southern parts orange and grapefruit groves present possibilities to the progressive beekeeper. In other sections black mangrove, coconut, saw and cabbage palmettos, and partridge pea are valuable honey plants.—J. H. Lovell.

275. ANONYMOUS. The Spanish needles as a honey producer. Amer. Bee Jour. 61: 90. 1921.—Honey from *Bidens aristosa* is reported by nearly every county in Kansas.—J. H. Lovell.

276. ANONYMOUS. Wild thyme in New York. Amer. Bee Jour. 61: 53. 1921.—*Thymus serpyllum* has established itself over several square miles at Prattsville, New York. The honey is light amber in color, with a good body and a very good flavor. During 25 years the honey flow has never entirely failed.—J. H. Lovell.

277. ALLEN, GRACE. **Beekeeping as a sideline.** Gleanings in Bee Culture 49: 94-95. 1921.—This is a popular description of insect- and wind-pollinated flowers.—J. H. Lovell.

278. ALLEN, GRACE. **Beekeeping as a sideline.** Gleanings in Bee Culture 49: 157-158. 1921.—This popular review of the main nectar-yielding plants of the U. S. A. gives distribution and time of blooming.—J. H. Lovell.

279. BALDENSFERGER, PH. J. **Lavender.** Amer. Bee Jour. 61: 147-148. 1921.—Three species of lavender grow in the Alps. *Lavendula Stoechas*, common in the lowlands and hills species up to 330 feet, grows 20 inches tall and blooms March-May. *L. latifolia* grows at a higher altitude (600-1,320 feet) on calcareous soil, and blooms June-July. Neither of these species yield as much honey as *L. officinalis*, which grows at an altitude of 1,300 feet. The arid mountains are covered with bushes, which furnish a most delicious honey of a yellowish color, and which peasants sell by the hundred kgm. to perfume manufacturers.—J. H. Lovell.

280. BALDWIN, F. M. **A successful experiment with package bees.** Domestic Beekeeper 36: 10-11. 1921.—At Mt. Vernon, Georgia, the long honey flow from maples is very valuable. It begins early and continues until fruit bloom, or from Jan. 3 to Feb. 20. The temperature in this locality rarely drops below freezing.—J. H. Lovell.

281. BALDWIN, F. M. **Granulated honey.** Domestic Beekeeper 35: 15-16. 1921.—These notes on the honey plants of Georgia include mention of velvet bean, which is extensively planted for forage and secretes nectar well in the fall.—J. H. Lovell.

282. BALDWIN, F. M. **The color and flavor of gallberry honey.** Dixie Beekeeper 3: 12-15. 1921.—Pure gallberry (*Ilex glabra*) honey is difficult to get in Georgia. It is yellow in color and has the flavor of magnolia bloom. It has been erroneously reported to resemble white clover honey.—J. H. Lovell.

283. BALDWIN, E. G. **The honey plant regions of Indiana.** Amer. Bee Jour. 61: 51-53. 2 fig. 1921.—The author presents a description and map of the honey-plant regions of Indiana. Eight regions are recognized: (1) The limestone soils in the northern part of the state are covered with a heavy layer of clay, gravel, and sand, the clovers being less reliable than 100 miles south of the Michigan line. (2) The best clover belt is along the Wabash River extending from Cass to Adams and Wells counties; basswood is also abundant in this section. (3) A fairly good clover region extends from the Ohio line to Fountain County on the west border; Indianapolis is near the center of this area. (4) The best sweet clover region occupies the eastern portion of the state. (5) Locust (*Robinia pseudacacia*) is an important source of surplus in southeastern Indiana. (6) In the extreme southwestern portion climbing milkweed (*Gonolobus laevis*) yields large crops of honey. (7) From Knox County northward to Vermilion County along the west border smartweed may be considered as the main source of surplus. (8) In the Kankakee Valley marshland Spanish needles (*Bidens aristosa*) is the principal honey plant.—J. H. Lovell.

284. BENDER, C. F. **Red clover as a honey plant.** Amer. Bee Jour. 61: 99. 1921.—During protracted hot weather honeybees in large numbers gathered nectar from mammoth red clover. The flow lasted for 2 weeks, and 7,000 pounds of comb honey were secured. The quality was excellent but the color was a little darker than that of white clover and the flavor a little stronger.—J. H. Lovell.

285. BURKHOLDER, WALTER H. **The effect of two soil temperatures on the yield and water relations of healthy and diseased bean plants.** Ecology 1: 113-123. 1920.—The 2 soil temperatures used were 18 and 26°C., the results showing many irregular variations. In general diseased bean plants (*Fusarium Martii Phaseoli*) transpired about 50 per cent as much as healthy plants, and a similar reduction in yield of seed occurred. If transpiration and yield

are taken as criteria, the soil temperatures appear to have very little effect on the severity of Fusarium root rot of beans. But low soil temperature decreases the yield of healthy plants considerably.—Charles A. Skull.

286. BURNS, W., and G. M. CHAKRADEV. An ecological study of Deccan grassland. Jour. Indian Bot. 2: 84-91. 1 pl. 1921.—Seven acres of severely overgrazed "worst Deccan grazing land" near Poona, western India have been leased as an experimental plot for studying the problem of improvement of pasture land ruined by excessive grazing. After fencing the area, parts were cultivated and sown with various wild grasses; other parts were left to regenerate spontaneously. Six-m. square permanent quadrats have been laid out in different consocios in the area and studied in detail. For purposes of comparison, 2 other permanent quadrats have been laid out in the adjacent unprotected area. It is expected that protection, either alone or combined with a minimum of treatment, will enable valuable wild forage grasses to become established, after which intelligent exploitation will be necessary to maintain the pastures in a productive state.—Winfield Dudgeon.

287. CANNELL. The honey plants of France. Amer. Bee Jour. 61: 236. 1921.—The honey flora of France includes lavender (3 species), thyme, sage, mountain pennyroyal (*Satureja montana*), heather, borage, thistles, and *Mula viscosa*. Cultivated honey plants are locust, orange, alfalfa, sanfoin, clovers, and fruit bloom. From 25 to 75 pounds of a fragrant golden honey is secured from *Lavandula spica* (probably *L. vera*). Rosemary (*Rosmarinus officinalis*) is a slow but sure yielder of a very choice honey; the famous Narbonne honey is partly gathered from rosemary. If lavender and rosemary grew well in America they would be valuable additions to the honey flora.—J. H. Lovell.

288. CARLING, A. *Phacelia tanacetifolia*. Western Honey Bee 9: 6-7. 1921.—Fiddle-neck was formerly abundant on the cattle ranges of southern California, but thousands of acres have been destroyed by grazing. In Sweden on 500 square m. of land 1 kgm. of *Phacelia* seed was broadcasted and harrowed in. By the middle of August the plants had reached maturity and were $\frac{1}{2}$ m. high. The plants began blooming 8 weeks after planting and continued for 4 weeks. Honeybees gathered the nectar from 3 a.m. to 9:30 p.m.; 50-60 kgm. of honey were secured. The honey was pale yellow, clear, and thin, and had an excellent flavor.—J. H. Lovell.

289. CLAUSTRE, R. *Apiarian flora. Malope*. Gazette Apicole 22: 41. 1921.—*Malope* is an annual species of mallow which secretes nectar freely and blooms from May to July and again from October to November. The flowers are about the size of those of creeping mallow but have brighter colors. The large rugose leaves wilt and fall when blooming begins. The pollen is ash-gray colored. As soon as *Phacelia* begins to bloom the flowers are much less frequently visited by bees. *Malope* sowed at Ax (Ariege, France) reduced the diameter of its flowers and almost doubled the surface of its leaves.—C. P. Dadant.

290. COLEMAN, GEO. A. *Beekeeping in our California national forests I. Honey flora*. Western Honey Bee 9: 51-54. 1921.—The list includes all native herbaceous plants, shrubs, and trees valuable for pollen and nectar, also introduced species which have escaped from cultivation and are likely to prove good honey plants. Longleaf willow (*Salix longifolia*) yields a dark honey and much pollen and blooms from January to March. This species ranges from the Arctic Circle to Lower California and ascends the Sierra foothills to an altitude of 4,000 feet. White willow (*S. lasiolepis*) yields an amber-colored honey with a pleasant flavor, also much pollen. It blooms from February to March and ranges from northern to Lower California, and is valuable for early brood-rearing. Nuttall's willow (*S. flavescens*) is the earliest blooming mountain honey plant. It grows in the northern Coast Ranges, the Sierra Nevada, and San Bernardino Mountains. Silky willow. Velvet willow (*S. sitchensis*) is also valuable for nectar and pollen. The cottonwoods and poplars (*Populus Fremontii*, *P. trichocarpa*, *P. tremuloides*) furnish a large amount of pollen. California wax myrtle (*Myrica californica*) and sweet bay (*M. Hartwegii*) are wind-pollinated shrubs visited by bees for pollen. Mountain birch (*Betula fontinalis*) yields early pollen.—J. H. Lovell.

291. COLEMAN, GEO. A. **Beekeeping in our California national forests II. Honey flora.** Western Honey Bee 9: 84-86. 1921.—California hazelnut (*Corylus rostrata*), white alder (*Alnus rhombifolia*), red alder (*A. rubra*), mountain alder (*A. tenuifolia*), wind-pollinated shrubs, furnish early pollen. Scrub oak (*Quercus dumosa*), blue oak or mountain oak (*Q. Douglasii*), and tanbark oak (*Q. densiflora*) are wind-pollinated trees from which bees gather much pollen. Scrub oak is abundant in the chaparral. From blue oak in Monterey County sufficient honeydew is gathered in September and October to winter bees. Honeydew is also found on coast live oak. Tanbark oak blooms in warm locations in June, but usually the flowers open from the latter part of August to October. Giant chinquapin (*Castanopsis chrysophylla*) and golden chinquapin—variety *minor* of the preceding species—yield during late summer and in the fall a light amber-colored honey of good quality.—J. H. Lovell.

292. COLEMAN, GEO. A. **Beekeeping in our California national forest III. Honey flora.** Western Honey Bee 9: 116-117. 1921.—Bush chinquapin (*Castanopsis sempervirens*) is important in the fall for pollen. Wild buckwheat (*Eriogonum fasciculatum*) is abundant on the mesas and mountain slopes of southern California. It ranks 3rd as a honey producer in its range, white and black sages ranking it. It blooms from April to November. The honey is light to dark amber and of good quality. There are a dozen other nectar-yielding species at various elevations from the sea coast to the summits of the Coast Range. Mountain knotweed (*Polygonum Bolanderi*) blooms from July to September and yields an amber-colored honey. Dotted smartweed (*P. acre*) blooms from June to the middle of September, yielding abundant but poor quality honey. Ice plant (Sea fig, *Mesembryanthemum equilaterale*), grows on dunes and cliffs from Marin County to San Diego County. The flowers open at mid-day throughout the summer. The honey is white and has a good flavor. Two species of *Clematis* and the common buttercup are valuable chiefly for pollen.—J. H. Lovell.

293. COLEMAN, GEO. A. **Beekeeping in our California national forests No. II. Honey flora. IV.** Western Honey Bee 9: 149-151. 1921.—California barberry (*Berberis pinnata*), rather common on the hills from San Francisco to Monterey, blooms in March and April. The honey is amber-colored and has a good flavor. California laurel, bay-tree, or Oregon myrtle (*Umbellularia californica*), is found in the cañons of the Coast Ranges from southern Oregon to San Diego; it blooms from December to March. The honey is dark amber, and is valuable for early brood-rearing. Cream cups (*Platystemon californicus*) is common throughout a large part of California, blooming from April to May and valuable for pollen. Matilija poppy (*Romneya Coulteri*), valuable for pollen, is found from Santa Maria River to San Diego County. California poppy (*Eschscholtzia californica*) yields abundant pollen. Western poppy (*Papaver californicus*) grows in the southern part of the state and is valuable for pollen. Two early blooming honey plants are the flowering currant (*Ribes sanguineum*) and common gooseberry (*Ribes Mensiesii*). Chamise (*Adenostoma fasciculatum*) is the most abundant and characteristic shrub of the higher Coast Ranges and the Sierra Nevada. It frequently forms extensive thickets to the exclusion of all other vegetation. These thickets, known as "chemisals" or chamise brush, cover wide areas with a low dense growth of a uniform blue green color. Chamise yields a light amber honey of good quality. The wild raspberry (*Rubus leucodermis*) and the common blackberry (*Rubus vitifolius*) secrete much nectar and in good seasons yield a surplus of honey. Mountain mahogany (*Cercocarpus parvifolius*), a common chaparral shrub in the mountains, is valuable for nectar.—J. H. Lovell.

294. COLEMAN, GEO. A. **Beekeeping in our California national forests No. II. Honey flora. V.** Western Honey Bee 9: 182-184. 1921.—Oregon crab apple (*Malus rivularis*) blooms from May to June and yields a white delicious honey. Black haw (*Crataegus Douglasii*) in April and May is the source of a white honey. Christmas berry (*Heteromeles arbutifolia*) yields in July a reddish honey of good quality and pleasant flavor. Several species of cherries and plums yield a light colored honey of good flavor.—J. H. Lovell.

295. COMBES, R. [Rev. of: ANNET, E. Contribution à l'étude du palmier à huile. Le palmier à huile au Cameroun, variétés, culture, exploitation. (Contribution to the study of the oil-palm. The oil-palm of Kamerun, varieties, culture, and uses.) Thèse de Doctorat, Larose, éditeur, 11, rue Victor-Cousin, Paris.] Rev. Gén. Bot. 33: 398. 1921.

296. CRANE, J. E. Wild thyme in New York. Amer. Bee Jour. 61: 179-180. 1921.—Wild marjoram (*Origanum vulgare*) is an important honey plant in southwestern Vermont. It has been incorrectly called wild thyme. The question is raised whether the plant in New York described as wild thyme is not wild marjoram.—J. H. Lovell.

297. DADANT, C. P. Those honey plants from China. Amer. Bee Jour. 61: 22. 1921.—Rape (*Brassica Rapa*) in China yields an immense amount of nectar. The honeyflow lasts from the middle of April to the first of May. It is a profitable crop in Australia, where it is valuable for both pollen and nectar.—J. H. Lovell.

298. ENSIGN, G. L. Star thistle. Amer. Bee Jour. 61: 89. 1921.—*Centaurea solstitialis* is an important source of honey in the Sacramento and San Joaquin Valleys, California. It blooms from June 10 until heavy frosts.—J. H. Lovell.

299. FOX, ELIAS. Trees for honey. Amer. Bee Jour. 61: 64. 1921.—The box elder (*Acer Negundo*) is not only an excellent shade tree, but is also valuable for both nectar and pollen.—J. H. Lovell.

300. HABER, VERNON R. The honey producing possibilities in North Carolina. Amer. Bee Jour. 61: 217-218. 1921.—The flora of North Carolina is intermediate between those of the northern and southern states. The great variation in climate and altitude makes possible a large number of species. The state is divided into 3 well-defined regions: The Coastal Plain, the Piedmont Plateau, and the mountainous region.—The Coastal Plain is a vast area of lowland, the eastern half of which is not more than 20 feet above sea level. Swamps and lakes abound, and the coast-line is deeply indented by broad tidewater rivers, bays, and sounds. The normal average precipitation is 54 inches. The most important honey plants are the tupelos (*Nyssa biflora* and *N. aquatica*), gallberry (*Ilex opaca*), tulip-tree (*Liriodendron tulipifera*), rattan-vine (*Berchemia scandens*), and huckleberry. The tupelos and rattan-vine occur on thousands of acres of swampland; gallberry, holly, and huckleberry grow upon higher soils. This section offers the best opportunity for apiculture. Many apiaries range from 100 to 125 colonies of bees, and report an average surplus per colony of 45-50 pounds. The honey flow comes very early in the spring.—The mountainous area covers about 6,000 square miles. The summers are cooler and the winters are more severe than in the eastern part of the state. A magnificent forest of hardwood trees reaches its highest development in this region. Sourwood (*Oxydendrum arboreum*), most abundant on the eastern slopes of the Blue Ridge Mountains, is the most important source of honey. Basswood is common on the northern slopes of the larger mountains. Other valuable honey plants are tulip-tree, locust, maple, sumac, wild cherry, goldenrod, and aster. The honey-flow from the tulip-tree begins about May 15, and from basswood and sourwood the latter part of June. Most of the surplus honey comes from forest trees.—The intermediate region is occupied by the Piedmont Plateau; it is the agricultural section of the state. Sourwood is most abundant in the upper portion nearest the mountains. Among the more important honey plants are tulip-tree, clovers, persimmon, holly, sumac, fruit-trees, cow-peas, maple, blackberry, goldenrod, and aster. Aster yields a prolonged flow of nectar in autumn, and 25-30 pounds of surplus honey often being secured. The apiaries are rather small and many of the honey plants are not reliable every year though there is seldom a complete failure.—J. H. Lovell.

301. HADSELL, B. A. Nectar from alfalfa. Gleanings in Bee Culture 49: 363. 1921.—Many farmers ruin both the seed and honey crop of alfalfa by over-irrigation.—J. H. Lovell.

302. HASSLBAUER, A. M. **The honey crop conditions.** Beekeepers' Item 5: 15, 44, 76, 108. 1921.—Brief notes are given on the condition of Texan honey plants.—J. H. Lovell.

303. HASSLBAUER, A. M. **The honey crop conditions.** Beekeepers' Item 5: 140. 1921.—Pin wheel or marigold (*Gaillardia pulchella*), a well known honey plant in Texas, is confined chiefly to the black land and the adjoining limestone hills; it is rarely found on sandy or white clay soils. During the spring of 1921 in the vicinity of San Antonio, Texas, horsemint failed to yield much nectar, and the bees were dependent on marigold.—J. H. Lovell.

304. HOWARD, A., G. L. C. HOWARD, and A. R. KHAN. **Studies in the pollination of Indian crops.** Mem. Dept. Agric. India Bot. Ser. 10: 195-218. Pl. 5. 1919.—Methods of pollination of the following plants are given: San-hemp (*Crotalaria juncea* L.), pigeon pea (*Cajanus indicus* Spreng.), Java indigo (*Indigofera arrecta* Hochst.), Sumatran indigo (*I. sumatrana* Gaertn.), flax (*Linum usitatissimum* L.), Taramira or duan (*Eruca sativa* Lam.), Til (*Sesamum indicum* L.), Niger (*Guizotia abyssinica* Cass.), round podded jute (*Corchorus capsularis* L.), long podded jute (*C. olitorius* L.), Roselle (*Hibiscus Sabdariffa* L.).—J. J. Skinner.

305. KNABENSHUE, S. S. **Southern California honey prospects.** Western Honey Bee 9: 139. 1921.—In the spring of 1921 weather conditions in southern California were unfavorable to nectar secretion by orange bloom, and only a small surplus of honey was secured. Late rains ensure 50 per cent of a full crop of honey from the sages.—J. H. Lovell.

306. LIVINGSTON, T. W. **How far do bees fly for nectar.** Dixie Beekeeper 3: 17. 1921.—Bees do not usually fly more than 1 mile from the hive in gathering nectar, but occasionally store a surplus from flowers 3-4 miles distant. Italian bees on an island in Puget Sound gathered nectar from goldenrod on the mainland 5 miles away.—J. H. Lovell.

307. LOVELL, JOHN H. **A plant honeydew from the Douglas fir.** Amer. Bee Jour. 61: 93. 1921.—The author summarizes the observations of Davidson and Teit on the exudation of a sweet liquid by the tips of the leaves of *Pseudotsuga Douglasii*. A beekeeper at Victoria, British Columbia, reports 2-3 supers of sections are gathered in some seasons from this source. The honey is fair in quality, pale amber-colored, with rather dark cappings; it crystallizes early. It is a poor winter food.—J. H. Lovell.

308. LUSHER, A. E. **Fogs affect nectar secretion in sage.** Gleanings in Bee Culture 49: 362. 1921.—Sage yields nectar better in the fog belt than in the region beyond it.—J. H. Lovell.

309. MILLEN, F. ERIC. **Sweet clover as a honey plant.** Canadian Hort. and Beekeeper 29: 3-4. 1921.—The value of sweet clover (*Melilotus*) as a honey plant varies greatly with the locality. In the U. S. A. it has long been recognized as a valuable source of surplus. In Canada its value has not yet been determined. Possibly in Ontario the acreage of sweet clover in any one district is too small to yield large honey crops. Soil and weather conditions are also important factors affecting nectar secretion, examples being cited in alsike (*Trifolium hybridum*) and white or Dutch clover (*T. repens*). The following yields for sweet clover obtainable in Ontario are given; in 1 apiary a colony stored 23 pounds in 1 day; in another, 500 pounds were stored in 5 weeks. Thirty-two weak colonies gave 4,500 pounds surplus; and 88 packages gave 6,000 pounds surplus and increased to 99 colonies. In Ontario sweet clover honey is light in color and mild in flavor.—F. W. L. Sladen.

310. MORRIS, T. B. **Observations on horsemint.** Beekeepers' Item 5: 138. 1921.—The secretion of nectar by *Monarda punctata* is greatly affected by weather conditions.—J. H. Lovell.

311. OSTERHOUSE, G. W. Rape. Amer. Bee Jour. 61: 236-237. 1921.—Large fields of rape (*Brassica Napus*) are grown in the Netherlands. Beekeepers pay a good rent for locations near fields of blooming rape.—J. H. Lovell.

312. PARKS, H. B. Effect of soils on honey flows. Beekeepers' Item 5: 39-40. 1921.—Two centuries ago Della Torre noticed that bees visit plant species growing in one kind of soil, but do not visit the same species growing in another kind of soil. Sourwood (*Oxydendrum arboreum*) thrives on acid soils but not on limestone soils; buckthorn (*Rhamnus*) on the contrary is found on limestone soils. In New York white clover yields more nectar on limestone soils than on acid soils. In Texas the distribution of almost every plant is determined by the rock formation.—J. H. Lovell.

313. PELLETT, FRANK C. Correct name for wild thyme. Amer. Bee Jour. 61: 180. Fig. 1-4. 1921.—Wild thyme (*Thymus serpyllum*) and wild marjoram (*Origanum vulgare*) are often confused. Both are naturalized from Europe and both occur in New England and New York. A brief description is given of each species.—J. H. Lovell.

314. PELLETT, FRANK C. Garden plants which attract the bees. Amer. Bee Jour. 61: 175. 1921.—Many garden flowers,—bee balm, bachelor's button, marjoram, horehound, lavender, and mignonette,—are valuable sources of nectar. Among the vegetables, onions, celery, parsnips, and cabbage are good honey plants.—J. H. Lovell.

315. PELLETT, FRANK C. The orange as a source of nectar. Amer. Bee Jour. 61: 138. 1921.—The quality of orange honey is so high that it often commands a premium in the market. The groves of Satsuma oranges along the coast of Mississippi are not regarded as of much importance; likewise in Florida the orange yields nectar much less freely than in California. At Visalia, California, the flow is so heavy that the clothing of men engaged in cultivating the groves is saturated with nectar. A Tulare County beekeeper extracted 171 pounds of orange honey in 10 days. Near large orange orchards apiaries contain as many as 400 colonies. Along the coast the fogs are unfavorable and the flow is much lighter than in the interior.—J. H. Lovell.

316. REDWAY, JACQUES W. An overlook of the relations of dust to humanity. Ecology 1: 190-192. 1920.—The floating and wind-borne dust of the atmosphere is briefly discussed. The ecological relations of dust to disease-producing bacteria, especially in cities, are touched upon.—Charles A. Shull.

317. ROOT, E. R. The call of the Southland. Gleanings in Bee Culture 49: 206-209. 1921.—In the Coastal Plain of Virginia, North Carolina, South Carolina, Georgia, and Alabama the soils along the rivers and bays and in the swamps are acid and unfavorable to clovers. The most important honey plants are titi, gallberry, blackberry, huckleberry, and the tupelos, which flourish in acid soil. The best honey comes from gallberry (*Ilex glabra*) and is very similar in color, flavor, and body to that of white clover. Its quality is often impaired by the presence of titi honey. The tupelos are the source of an excellent white honey which never granulates. There are wonderful opportunities for beekeeping in this section, but the conditions are very different from those in northern states.—J. H. Lovell.

318. SANDERS, H. W. Seasonable notes. Domestic Beekeeper 35: 8. 1921.—The 1st honey flow of importance in the North [U. S. A.] comes in May from the dandelion. The honey is thick, yellow, and strong-flavored, with the odor of the dandelion. It is very valuable for stimulating brood-rearing.—J. H. Lovell.

319. SCHRELS, W. B. Beekeeping in foreign lands. Interesting facts about apiculture in little Costa Rica. Gleanings in Bee Culture 49: 146-148. 1921.—A list of the most important honey plants in Costa Rica includes citrus fruits, mesquite, almond, catsclaw, many vines, and tropical fruits. The honey flow begins with the dry season, which lasts 6 months; with the 1st rain, in April, the flow decreases.—J. H. Lovell.

320. SCULLEN, H. A. **Beekeeping in the State of Washington.** Amer. Bee Jour. 61: 96-97. 1921.—From the standpoint of bee culture the state may be divided into 5 distinct regions: (1) Yakima, Columbia, and Okanogan Valleys, and the district about Walla Walla, where the main honey plants are alfalfa and sweet clover; (2) arid region east of the Cascades, not yet under irrigation; (3) extreme northeastern part of the state where the annual rainfall is over 20 inches. The surplus comes from fireweed (*Epilobium angustifolium*), white clover, snowberry (*Symphoricarpos*), dandelion, and alfalfa; (4) the east and southeast counties, where wheat-growing is the leading industry. White clover is the most important honey plant; (5) the largest region is that portion of the state west of the Cascade Mountains, where the annual rainfall varies from 20 to 200 inches. Fireweed is the leading honey plant, but white and alsike clovers, Oregon maple, vine maple, Cascara sagrada, huckleberry, and many others are important locally.—J. H. Lovell.

321. SHORTIDGE, CHAS. B. **Coreopsis as a source of honey.** Amer. Bee Jour. 61: 66. 1921.—Along the Delaware River *Bidens trichosperma* and *B. laevis* are reliable honey plants. An average per colony of 20 pounds of extracted honey has been secured, with 20 pounds left in the hives for winter stores. The honey is light yellow and has a faint spicy odor and flavor. The plants are often called Coreopsis.—J. H. Lovell.

322. SLADEN, F. W. L. **Beekeeping in the North.** Canadian Hort. and Beekeeper 29: 4. 1921.—Conditions 200-300 miles north of the international boundary are described. Willows, blueberry (*Vaccinium canadense*), bluebell (*Mertensia paniculata*), wild strawberry, and Labrador tea (*Ledum groenlandicum*) are among the principal plants which build up the colonies in spring. Alsike, white clover, and fireweed (*Epilobium angustifolium*) are the principal sources of surplus honey. The spreading of alsike and white clover in the cleared districts of the clay belt in northern Ontario and northern Quebec augurs well for the future of beekeeping there. A fairly good honey crop is obtained from white clover around Dauphin, Manitoba, and Edmonton, Alberta, where it is moderately plentiful. The honey flow from clover, begins 2-3 weeks later in the north than in the south but lasts 4-5 weeks longer. Fireweed, which grows abundantly after forest fires, is scattered across the continent and is spreading as the land is cleared. For 4 consecutive years a good honey crop has been obtained at Melfort, northern Saskatchewan, mainly from fireweed. Fireweed honey flow is usually terminated abruptly about the end of August or the beginning of September by light frosts. Minor honey plants are asters, especially *Aster macrophyllus* (Ontario), goldenrod, (Quebec to Saskatchewan), anise (*Agastache foeniculum*), hyssop (Manitoba, Saskatchewan, and Alberta), and wild raspberry (Haileybury, Ontario). Aster honey when unripe has caused winter loss in northern Ontario. The north is particularly well adapted for beekeeping, as the warm days and cool nights favor nectar secretion, and the long working days increase the honey crop. In favorable seasons 200 pounds of clover honey per colony is common near Lake Temiskaming. At Roberval on Lake St. John, Quebec, an average annual colony-yield of over 200 pounds is obtained from alsike and white clover. July and August are the best honey-producing months.—F. W. L. Sladen.

323. SLADEN, F. W. L. **Fireweed or willow-herb; a great honey plant of the far North extending into this country in a few places only.** Gleanings in Bee Culture 49: 212-214. 2 fig. 1921.—*Epilobium angustifolium*, a native of northern North America and Eurasia, has a more northern range than any other important honey plant. In Canada it is most abundant in British Columbia, but it extends eastward to the Atlantic maritime provinces. It springs up abundantly on newly burned over forest land, but usually dies out after a few years. At Hector, British Columbia, it is found at an altitude of 5,200 feet. In a good fireweed locality a surplus of 500 pounds per colony has been obtained. At Montceff, Quebec, the average annual yield per colony in a large apiary was about 100 pounds. In the Gatineau Valley the honey flow lasts from about July 10 to September 5. Fireweed is propagated both by seed and by rootstocks. Solitary stalks of a white-flowered variety were observed in a stand of fireweed at Monteith, Ontario. The honey is almost water white, has a mild flavor, and granu-

lates after extraction.—High up in the mountains of British Columbia there is another species, *E. latifolium*, which has broader leaves and larger flowers, but is less than 1 foot tall.—J. H. Lovell.

324. SMALL, A. V. Sources of Kansas honey. Amer. Bee Jour. 61: 62-63. 1921.—Alfalfa and sweet clover are the principal honey plants. The secretion of nectar by alfalfa is affected by altitude.—J. H. Lovell.

325. TOCHUDIN, ERNST. Nectar secretion affected by altitude. Gleanings in Bee Culture 49: 100. 1921.—The intense radiation at high altitude stimulates the secretion of nectar. The average honey production per colony, according to statistics prepared by the French Departement des Pyrenées, is as follows: from sea level to 1,000 feet, 6 pounds, 10 ounces; from 1,000 to 2,000 feet, 8 pounds, 3 ounces; from 3,000 to 4,000 feet, 15 pounds, 7 ounces; from 4,000 to 5,000 feet, 19 pounds, 13 ounces.—J. H. Lovell.

326. VOHIES, CHAS. Mexican palo-verde. Gleanings in Bee Culture 49: 162. 1921.—Mexican palo-verde or "bogota" (*Parkinsonia aculeata*) is abundant on the university campus, Tucson, Arizona. It is a native of Mexico and extends into Arizona in the extreme southwest for a short distance only. A part of the first crop of honey comes from this source. The quality of the honey is good.—J. H. Lovell.

327. WEST, G. F. Beekeeping in sunny Alberta. Western Gardener and Poultry Jour. 2: 77-78. 1921.—Beekeeping conditions at Medicine Hat, Alberta, Canada, are discussed. Irrigation projects are being installed and some are in operation. Alfalfa (*Medicago sativa*) when grown on irrigated land in this vicinity will yield an enormous crop of honey. Wolfberry (*Symphoricarpos occidentalis*) also contributes a part of the crop, and there is at times a twang of bergamot honey (*Monarda mollis*). Gumweed (*Grindelia squarrosa*) grows in large patches, but no bees were seen working on it, and the honey does not have the objectionable flavor attributable to this plant.—F. W. L. Sladen.

328. WILDER, J. J. Flora for comb honey. Dixie Beekeeper 2: 12-14. 1921.—Among the best regions for the production of comb honey in the Southeast are the Black Belt of Mississippi, central Florida, southeast Georgia, and along the Apalachicola River in northwestern Florida.—J. H. Lovell.

329. WILDER, J. J. Pepperbush. Dixie Beekeeper 2: 15-16. 1921.—*Clethra alnifolia* yields a light amber-colored honey with good flavor and body. In southeast Georgia this shrub makes beekeeping around the great swamps possible. It furnishes all of the winter stores and maintains brood-rearing during a period when it would otherwise cease. A surplus is obtained in some localities. It begins blooming July 1 and continues until late fall, but the flow is never very heavy.—J. H. Lovell.

330. WILDER, J. J. Sourwood as a honey plant. Dixie Beekeeper 2: 10-12. 1 fig. 1921. *Oxydendrum arboreum* is the most important honey plant of the Blue Ridge section of the southeastern states. It not only grows on the mountain sides and on the hills of the Piedmont Plateau but also along streams of the Coastal Plain. In the lowlands the bees gather no nectar from it. While it is common on the mountains it never forms a dense growth. It does not yield well every year, and in some seasons no surplus is obtained. The best crop ever secured was an average of about 100 pounds per colony. The honey is almost water white, with heavy body and mild delicious flavor.—J. H. Lovell.

331. WILDER, J. J. Summer farewell. Dixie Beekeeper 3: 3-4. 1921.—Aster is very abundant on the sandy soils of northern and central Florida. The honey is almost water white and has an excellent flavor and good body. It granulates at the beginning of cold weather. A surplus of 30-50 pounds per colony is often obtained, but 150 pounds have been removed from a single colony.—J. H. Lovell.

332. WUST. Bienenährpflanzen mit schneller Vermehrungsfähigkeit für Imkergärten. [Honey plants, which grow and spread rapidly, for the beekeeper's garden.] Bienenfliege 43: 42. 1921.—Garden plants of special value for honey are noted and described.—*M. G. Dadant*.

333. ZEISS. Der Götterbaum. [Tree of Heaven.] Bienenfliege 43: 60. 1921.—The value of *Ailanthus glandulosa* for shade and honey is discussed. It blooms in central Europe from June 5 to 25, and is a good honey producer.—*M. G. Dadant*.

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 111, 132, 157, 210, 245, 270, 271, 508, 515, 787, 815, 906, 921, 923)

334. ANONYMOUS. Conférences congrés de 1921 de la Société Forestière de Franche-Comté et Belfort. [Discussions at the 1921 annual meeting of the Forest Society of Franche-Comté and Belfort.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 109-174. 1921.—The following subjects are discussed in more or less detail: the climate of Alsace north of Mulhouse and its influence upon the forest vegetation; the forest organization before and after the war; the development of the Rhine River in Alsace; the forests of the Hartmann, including details of damage done by the war, the work necessary to reestablish their management, and the results accomplished to date; the forest of Ribeauville, its location, species, and the essentials for its management and yield; the forest of Freland, and the silvicultural management of a forest of mature Scotch pine with an understorey of fir.—*J. Kittredge, Jr.*

335. ANONYMOUS. Notes on *Santalum album* in the Chittoor District of the Madras Presidency. Indian Forester 48: 32-34. Pl. 1-2. 1922.—To test the ability of sandal to grow non-parasitically, a pure plantation was established surrounded by a trench so that the roots could have no connection with other plants. The sandal is flourishing quite as if parasitic, no "spike" has developed, and individual plants have grown rapidly.—*E. N. Munns*.

336. ANONYMOUS. The National Geographic Society completes its gifts of big trees. Nation. Geog. Mag. 40: 85-86. 1921.—A statement is given of the activities of the National Geographic Society in the preservation for the American people of 1916 acres in Sequoia National Parks, "containing the finest stand of *Sequoia washingtoniana* in the Sierra."—*W. M. Atwood*.

337. ANONYMOUS. Vade-mecum du forestier. [Foresters' hand book.] 192 p. Société Franche Comté et Belfort. 1921.—This handbook in pocket size for the use of French forest officers contains condensed information, much of it tabulated, under the following headings: calendar of forest activities; arithmetic and practical geometry; physics as it relates to forestry; volume measurements and estimating; grading, uses, and products of wood; improvements and planting; and miscellaneous useful information.—*J. Kittredge, Jr.*

338. ANONYMOUS. Forests in relation to stream flow and erosion. [Rev. of: BATES, C. G., and A. J. HENRY. Stream-flow experiment at Wagon Wheel Gap, Colorado. Monthly Weather Rev. Suppl. 17. 65 p. Government Printing Office: Washington, 1922.] Nature 109: 417. 1922.—The number of stations used for rainfall record is not large enough to warrant implicit confidence in the results.—*O. A. Stevens*.

339. ANONYMOUS. [Rev. of: HANSON, C. O. Forestry for woodmen. 2nd ed., 238 p., 15 pl. Clarendon Press: Oxford, 1921.] Nature 109: 547. 1922.

340. ANONYMOUS. Marine borers in San Francisco Bay. [Rev. of: Report on the San Francisco Bay marine piling survey prepared under the supervision of the San Francisco Bay Marine Piling Committee of the American Wood-Preservers' Association. BLAKE, E. M.

Introduction. GRUNSKY, C. E. Hydrographic phase—the hydrography of San Francisco Bay. KOFOLD, CHARLES A. Biological phase—the marine borers. HUNT, G. M., and C. L. HILL. Engineering phase—pile protection materials and methods. 104 p., 36 pl. 1921.] Nature 109: 426-428. 1922.

341. ALGAN, H. Nos bois coloniaux. [Our colonial woods.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 271-279. 1922.—A résumé is given of 2 pamphlets by André Bertin, who estimates that France will require importations of wood at the rate of 8 million cubic m. per year for the next few years. This amount can best come from the French colonies of the Atlantic, where the forests cover 60 million hectares,—12 million in the Ivory Coast, 30 million in Gabon, 12 million in Kamerun, and 5 million in Guiana. The 30 million hectares additional in Madagascar and Indo-China are too far away. Since the war a study has been made of the special qualities and usefulness of 500 species of trees from the colonies. A table indicates those suitable to replace species now in use. They are classified as substitutes (1) for poplar and yellow poplar, (2) for pine and fir, (3) for oak and teak, (4) for beech, hornbeam, and sycamore, (5) for elm, ash, and acacia, (6) for cabinet woods, and (7) for woods suitable for railroad ties, mine props, piles, etc. The common names, scientific names, country in which produced, average density, and characteristic color of each wood are given. The forests contain on the average 60 trees per hectare of 30 cm. diameter and over, with a volume of 250 cubic m., of which 150 cubic m. can be utilized. A plan for the management of the colonial forests will place at least 40 per cent of the total area of each colony under government control. Concessionaires will be obliged to leave in every parcel cut over a specified number of seed trees of desirable species.—*J. Kittredge, Jr.*

342. ALGAN, H. Sur la densité des sapinières. [Concerning the density of fir forests.] Bull. Trimest. Soc. Franche-Comté et Belfort 14: 242-244. 1922.—An indication as to what should be the normal number of stems per hectare of a given size in a complete and regular stand of fir may be secured as follows: 2 trees of equal diameter d grow at a distance apart trunk to trunk of D , such that $D = 10d + 1$ m. If the neighboring trees are not of the same diameter, the average of their diameters should be used for d . Assuming that a fir tree covers an area S equal to the square of the diameter of its crown, then $S = (10d + 1)^2$, and the number of trees per hectare will be $N = \frac{10,000}{(10d + 1)^2}$. A table is given based on this equation showing the number of trees per hectare from 10 to 60 cm. diameter breast high. It also gives for each diameter class the basal area per hectare. For various causes the increase in material is suspended when the stems measure from 40 to 45 cm. diameter breast high and the stand approaches $\frac{2}{3}$ of its normal volume at maturity.—*J. Kittredge, Jr.*

343. BARBEY, A. L'épicéa et la sécheresse de 1921. [Spruce and the drought of 1921.] Bull. Trimest. Soc. Franche-Comté et Belfort 14: 237-241. 1922.—The facts are outlined which caused the recent dying of spruce. Spruce requires considerable atmospheric humidity and frequent summer rains and consequent fresh soils to thrive and resist insect attacks. In introducing it on plains and shallow soils with summer droughts there is danger from droughts or from accompanying insect damage, such as occurred in 1907, 1911, and 1921. The bark beetles, weevils, long-horned beetles, and buprestids attack trees in full vitality only in exceptional cases. Brief descriptions are given of the attacks of *Tomicus typographus*, *T. chalcographus*, *Hylesinus polygraphus*, *Pissodes harcyniae*, *Collidium luridum*, and *Anthaxia quadripunctata*. The remedies are: avoid introducing spruce at low elevations in dry climates, and encourage the development of full-crowned trees without serious crowding or shading. If the trees are attacked they should be cut and the bark removed and burned at once.—*J. Kittredge, Jr.*

344. BOURNE, R. A dissertation upon forest finance. Indian Forester 48: 1-14. 1922.—The theory that the short rotation for forest crops for Indian species is most profitable is challenged and a detailed working out of the formula shows that the longer rotation gives the greater financial return. Examples are given to support the author's contention.—*E. N. Munns.*

345. BOUTILLY, V. La cause de la déformation des cèdres dans l'Atlas mitidjien. [The cause of the malformation of the cedars in the Atlas Mitidjien Mountains.] Bull. Sta. Recherches Forest. Nord Afrique 1: 218-221. Fig. 1-3. 1921.—*Cedrus atlantica* occupies a limited area about 8 km. long by 2 or 3 km. wide along the crest of the Atlas chain, at about the elevation of Blida. The forest is characterized by the deformation of all the old trees, which have lost their terminal shoots to have them replaced by several laterals, which results at the age of 30 or 40 years and over in a form of tree with numerous bayonet-like trunks which are useless for logs. The young trees less than 50 years old are straight and do not have this form. Within the last 3 or 4 years there has been a serious epidemic of a weevil (*Thaumetopoea pityocampa*) which has killed the leading shoots. Apparently this was the cause of the deformation of the older trees 50 years ago.—J. Kittredge, Jr.

346. BROOKS, A. The breaking strain of timbers. Agric. Gaz. New South Wales 32: 463. 1921.—The breaking stress of red ironbark [*Eucalyptus sideroxylon*], grey box [*E. hemiphloia*], and cypress pine [*Callitris* sp.] is compared with American white pine [*Pinus Strobus*].—L. R. Waldron.

347. BROWN, NELSON COURTLANDT. The place of utilization in American forestry. Jour. Forestry 20: 135-138. 1922.—Because of the great savings in the consumption of wood which are possible through the use of lower grades, better usage of materials, more careful methods in manufacture, and the use of wood preservatives, more attention should be given by the schools to forest utilization. Some schools are working to that end now, but more stress should be placed upon the subject as more and more men are entering the lumber industry.—E. N. Munns

348. BROWN, W. H. Minor products of Philippine forests. Forest. Bur. Philippine Is. Bull. 22¹. 438 p., 28 pl. 1920; 22². 410 p., 75 pl. 1921; 22³. 329 p., 26 pl. 1921 [1922].—This comprehensive, copiously illustrated work makes readily available a previously undigested mass of economic data on Philippine economic plants. The work is published in 3 volumes, each complete in itself, the 3rd presenting a complete index to all local and scientific names. The subjects covered are mangrove swamps, palms and palm products, bamboos, fiber plants, sources of paper pulp, resins, gums and oils, wild food plants, natural dyes, ornamental plants, soap substitutes, official medicinal plants, poisonous plants, miscellaneous useful plants, edible fungi, and medicinal uses of Philippine plants. Certain subjects have been treated by specialists, such as E. D. MERRILL, O. A. REINKING, LEON MA. GUERRERO, A. F. FISHER, and A. P. WEST.—E. D. Merrill.

349. C., S. Z. Der Ertrag der sächsischen Staatsforsten. [Yield of Saxony state forests.] Deutsch. Forstzeitg. 37: 381. 1922.—The production of the state forests decreased 11 per cent during the decade 1837-1846 in spite of a slight increase in area. In succeeding decades the stock was increased considerably, amounting to 27,000,000 cubic m. in 1873; at that time the rotation was lowered. Heavy cuttings caused deterioration of site conditions, and this, together with smoke from industrial plants and difficulties in securing natural reproduction resulted in a present growing stock nearly 15 per cent below normal. To restore a normal stock within a period of 25 years will require a net increase of 120,000 cubic m. per annum, and since the increment is 620,000 cubic m. this will permit an annual cut of 500,000 cubic m.—W. N. Sparhawk.

350. CHAMPION, F. W. The conversion of coppice and coppice-with-standards to high forest. Indian Forester 48: 15-22. 1922.—The arguments for and against conversion of coppice forests are listed. Those against conversion are listed as financial, economic, and technical. Under Aubert's system, which is given in detail, most of the disadvantages disappear. It is practicable and economical and is particularly applicable to areas of good quality coppice in which the inroads of the war upon the standards have been heavy.—E. N. Munns.

351. CHUN, W. Y. *Chinese economic trees*. xxviii + 309 p, 100 pl. The Commercial Press: Shanghai, China, 1922.—Brief descriptions of about 300 species are given. In many genera additional species are listed or mentioned. One hundred species are figured. New names are *Phoebe chinensis* Chun (*P. macrophylla* Gamble, non Blume), *Hicoria cathayensis* (Sargent) Chun (*Carya* Sargent), and *Amelanchier sinica* Chun (*A. asiatica* var. *sinica* Schneider).—E. D. Merrill.

352. COUPIN, HENRI. Les forêts au point de vue biologique. [Forests from the biological standpoint.] *La Nature* 50: 157-159. 1922.

353. DAVIS, W. M. Lower California and its natural resources. [Rev. of: NELSON, EDWARD W. *Lower California and its natural resources*. Mem. Nation. Acad. Sci. [U. S. A.] 16: 1-194. 1921.] *Geog. Rev.* 11: 551-562. 1921.—In this review the main emphasis is on geologic and geographic features with some mention of the forests and other types of vegetation, such as grassland and desert.—S. B. Shaw.

354. DAWKINS, C. G. E. Big Hnaw (*Adina cordifolia*) and teak trees. *Indian Forester* 48: 108-110. 1922.—The measurements of 2 large trees are given; the Hnaw was 23 feet 6 inches in girth at 4.5 feet and the teak 18 feet 2 inches in girth.—E. N. Munns.

355. DESCOMBES, PAUL. La forêt régulatrice et génératrice des eaux. [The forest as a regulator and generator of waters.] *Rev. Eaux et Forêts* 59: 139-142. 1921.—Forests affect the waters in 2 ways: (1) by making their flow more regular, and (2) by increasing their abundance through dews and mists which are deposited in a considerably greater quantity on foliage than on bare soil. The 1st influence has been scientifically demonstrated by the Swiss forest experiment station [see Bot. Absts. 9, Entries 710, 1232]. It was well illustrated in 1875 by floods in the Onne and the Pique, 2 adjacent streams the watersheds of which are practically identical except that the former is about 5 per cent, the latter about 40 per cent forested. The Onne increased its discharge with great suddenness and violence from 11 to 130 cubic m. and caused a damage of several hundred thousand francs, whereas the Pique increased its discharge much more gradually from 8 to 46 cubic m. and caused a damage of not more than 6,000 francs.—The influence of the forest in increasing the abundance of waters was investigated some 60 years ago by an engineer who reported that the discharge of springs is twice as much in forested as in deforested areas, and that reforestation can increase the discharge of springs by 7 cubic m. per day for every hectare reforested. Subsequent investigations have shown that the amount of water deposited by dews and mists in forested watersheds sometimes exceeds that coming from rainfall. In the 2 streams cited, it is regarded as fair to assume that the much greater annual discharge of the Pique (1,732,000 cubic m. per square km. as against 693,000 for the Onne) is due solely to the fact that the watershed of the former is 40 per cent and the latter only 5 per cent wooded. In this region the amount of water coming from unseen condensations in the forested areas is 5 times that coming from rainfall; reforesting $\frac{1}{3}$ of a watershed would double the discharge of its waters.—S. T. Dana.

356. DWIGHT, T. W. Timber administration of the Dominion Forest Service. *Jour. Forestry* 20: 4-9. 1922.—Some 22 million acres are under the Dominion Service, which is responsible for keeping these lands productive. Careful lumbering is insisted upon, and to reduce fire danger the brush is piled and burned concurrently with the logging work. Cutting is supervised in order to insure natural reproduction. Two nurseries supply trees for prairie and forest planting, the prairie planting having been successfully encouraged for 20 years.—E. N. Munns.

357. GALLAND, P. Rétablissement des forêts dévastées par la guerre. [Re-establishment of the forests devastated by the war.] *Bull. Trimest. Soc. Forest. Franche-Comté et Belfort* 14: 72-75. 1921.—The forests in the district of Saint-Dié were badly mutilated, in some cases considerable areas being completely destroyed. The dead wood should be utilized

at once, both to effect economy and to facilitate planting. In some places leveling the ground must precede planting. Trenches and dugouts have caused an increase in floods and a serious problem in the erosion and deposition in valleys. When the ground surface has been re-established it is planned to plant fir in the proportion of at least 80 per cent where there is some shrubby vegetation for protection. Lacking this, seed of *Genisteae* will be sown to provide shade, in which fir seed will be sown or nursery stock 15 to 18 cm. high planted, spaced 2 m. apart.—*J. Kittredge, Jr.*

358. GLASSON, A. K. Mortality of sal in Buxa Division, Bengal. *Indian Forester* 48: 22-32. 1922.—The abundance of dead sal was found to be due to the overflowing of rivers, and heavy mortality from climbers, windfall, and insects. Regulation of the cut, a revised scheme of creeper cutting, and insect control reduced the amount killed. The fungus *Polyporus Shoreae* was found to be causing damage, but the investigations of its action have not been completed. This fungus promises to be a serious factor in plantations.—*E. N. Munns.*

359. GRANT, MADISON. Saving the redwoods. *Nation. Geog. Mag.* 37: 519-536. 10 fig. 1920.—A discussion of the forests of *Sequoia sempervirens* in northwestern California and southern Oregon is given with a description of the life habits of the tree. A plea is made for the preservation of these forests.—*W. M. Atwood.*

360. HAUSENDORF. Der Langenbrander Schirmkellschlag von Forstmeister Dr. Eberhard und der Wagnersche Blandersaumschlag in Gaildorf. [The Langenbrand shelterwood-wedge system of Dr. Eberhard and the Wagner border-strip felling in Gaildorf.] *Zeitschr. Forst.- u. Jagdw.* 53: 474-482. Fig. 1-3. 1921.—Witzbach and the author visited both areas. Witzbach prefers Eberhard's system, for 3 reasons: it provides the forester with more managerial freedom, makes better use of the road system, and under it the silver fir at Gaildorf can be more easily retained. Hausendorf finds no basis for comparison, since it is not possible to compare an organic whole, the border-strip system, with a part of such a whole, the wedge system, the only object of which is to secure improved methods of removing timber from the forests. Advantages and disadvantages of the Wagner system are discussed.—*J. Roesser.*

361. HAWLEY, R. C., E. I. TERRY, and K. W. WOODWARD. Forest region and type classification for New England. *Jour. Forestry* 20: 122-129. 1922.—This report of a committee divides New England into 3 regions and specifies for each the types, with a description of the composition, origin, location, and importance of each of the forest types. Seven tree types are recognized, which are classified by topographic conditions, species, mixtures, or importance.—*E. N. Munns.*

362. HENRIEY. Le hêtre à Plancher-les-Mines. [Beech at Plancher-les-Mines.] *Bull. Trimest. Soc. Forest. Franche-Comté et Belfort* 14: 76-79. 1921.—An account is given of marking, the forest being composed of fir in mixture with beech or in mixtures with fir, beech, ash, maple, and elm; the last 3 are favored in the marking. Beech is marked more heavily than fir because the latter is utilized for lumber and dimension stock and has a higher value. Beech is of inferior quality and is used little except for firewood. The proportion of species in this forest is: fir 37 per cent, spruce 17, beech 34, and miscellaneous hardwoods 12. Beech occupies more space than fir of equal diameter and, hence, has a smaller volume per unit of area. The growth of fir forest, after the trees are over 60 cm. in circumference, is more than 5 times that of the beech forest.—*J. Kittredge, Jr.*

363. HOLMGREN, A. LEO. Stormhärjningens Hösten 1917 å Älvdalens Besparingssskog. [A storm in the Älvdal forest in the autumn of 1917.] *Skogsvårdsför. Tidskr.* 19: 172-178. Fig. 1-3. 1921.—The article gives an account of the damage wrought by a severe storm in Dalarne, Sweden. Tables and graphs show the number of windfalls and damaged trees by species, diameter, and height classes.—*G. A. Pearson.*

364. HOWARD, S. H. **Thinnings.** *Indian Forester* 48: 110-112. 1922.—An answer is given to some of the criticisms of thinning methods. It is not necessary to make heavy thinning in a stand which has been thinned from the beginning, but it is necessary when previous thinnings have been neglected.—*E. N. Munns.*

365. HOWE, C. D. **Our forest conditions and some of our forestry problems.** *Ann. Rep. Quebec Soc. Protection Plants* 14: 23-30. 1922.—"Briefly our forest conditions present this problem: Shall we accept for our lumbering and pulpwood industries the wood of constantly decreasing quality which nature unguided produces when the equilibrium in the forest has been upset by fire, disease or logging operations, or shall we exert intelligent effort to maintain our pine, spruce, and other valuable forests and thus supply the forest industries with wood of incomparable quality particularly adapted to their needs?"—*B. T. Dickson.*

366. JOANNIS, J. DE. **Les chenilles des cônes de cèdre.** [The cone weevils of cedar.] *Bull. Sta. Recherches Forest. Nord Afrique* 1: 187-199. *Pl. 19-20.* 1921.—Various species of the genus *Doryctria* which seriously damage the Algerian cedar are described.—*J. Kittredge, Jr.*

367. KHAN, ABDUL AZIZ. **Charcoal making in the Central Provinces.** *Indian Forester* 48: 102-104. *Pl. 7.* 1922.

368. MER, ÉMILE. **Possibilité par volume.** [Regulation by volume.] *Bull. Trimest. Soc. Forest. Franche-Comté et Belfort* 14: 6-24. 1921.—Regeneration cuttings are not suited to the fir forests of the Vosges Mountains because the winds are too violent, the cutover areas are too readily invaded by brush, and the fir is not sufficiently fertile. Sustained yield should be abandoned for it constitutes, especially in irregular stands, an obstacle to cultural operations which too often cannot be undertaken in time to be effective. There results a serious loss of production. With the sustained yield the regulation by volume, which serves only to establish it, would also disappear. The cutting cycle should be so arranged that blocks are cut over on short rotation at frequent intervals so that mature trees can be exploited where they are too numerous, thinnings made in young stands, young growth disengaged, and openings planted.—*J. Kittredge, Jr.*

369. MILLAR, W. N. **Status of forestry in western Canada.** *Jour. Forestry* 20: 10-17. 1922.—The work of the past 5 years by foresters in western Canada is reviewed in which the progress in administration, protection, and development are outlined. The 3 most important developments are the disposal of slash, cooperative live-stock grazing, and the use of the airplane patrol in fire protection. Other work which has been developing more slowly includes forest and utilization investigations, nursery practice, forest surveys, and the establishment of a forest school.—*E. N. Munns.*

370. NOWACK, ERNEST. **A contribution to the geography of Albania.** *Geog. Rev.* 11: 503-540. 1921.—In an extended description of Albania the forest, brushwood, maqui, and heath vegetation are discussed in relation to altitude and precipitation.—*S. B. Shaw.*

371. OSMASTON, A. E. **The mensuration of plantations.** *Indian Forester* 48: 74-78. 1922.—The ordinary formulas given for the number of plants per acre do not include the space left at the edges of these areas and the increased growth secured by border trees. New formulas are developed and examples given for determining correctly the true number involved.—*E. N. Munns.*

372. PRUTZ, VON. **Die Entwicklung der Klenganstalten in den letzten 25 Jahren.** [The development of seed-extracting establishments in the last 25 years.] *Zeitschr. Forst- u. Jagdw.* 53: 257-277. *Charts 1-6.* 1921.—A description is given of the seed-extracting establishments of Eberswald, Annaburg, and Klausenau constructed within the past 25 years which

shows the improvement from the compartment or box type of kiln to the cylindrical kiln with preliminary drying chambers. Haack's experiments show that the danger to which the seed is subjected by the heat in drying is directly proportional to the percentage of moisture in the cones. It has also been established that the origin of the seed is of great importance, even though the climatic variation in Prussia does not exceed 1°C. Seed from different sources should be kept separate. Small extracting establishments are desirable and to avoid the old compartment form a "safety seed extracting kiln" has been placed on the market for small operators. This is described and illustrated in detail. Its chief feature is 3 drying compartments: the upper, where the cones are subjected to 40°C until $\frac{1}{4}$ open; the middle, where 50°C is maintained until the cones are $\frac{1}{2}$ open; and the drum proper where a temperature of 55°C is maintained until all seed is removed. The capacity of this establishment is about 2,000 kgm. of seed during the operating season from Dec. 15 to May 1. It has marked advantages over the old method of seed extraction and the health of the operator is not impaired by working in intense heat and dust.—J. Roesser, Jr.

373. PRATT, MERRITT B. *Shade and ornamental trees of California*. 150 p., 137 pl. California State Bd. Forest. 1922.—A description is given of 152 native and exotic trees with large plates of the more important ones planted in California. Species suitable for planting in different localities in the State are listed by regions.—E. N. Munns.

374. RECKNAGEL, A. B. [Rev. of: BRUCE, DONALD. *A white fir volume table*. California Agric. Exp. Sta. Bull. 329. 41-45. 1921.] Jour. Forestry 20: 75. 1922.

375. RECKNAGEL, A. B. [Rev. of: FISHER, RICHARD T. *The management of the Harvard Forest, 1909-1919*. Harvard Forest Bull. 1. 27 p. 1921.] Jour. Forestry 20: 75-77. 1922.

376. RECKNAGEL, A. B. [Rev. of: HAASIS, F. W. *Relations between soil type and root form of western yellow pine*. Ecology 2: 293-303. 1921.] Jour. Forestry 20: 147-149. 1922. —While the author did not find a correlation between growth water and root form, the general character of the root system is induced by the conditions under which the tree has developed. Branching and different root forms are more the result of external conditions than the response to soil. Root competition in the semi-arid regions is worth considerable study as it is probably of more importance than the light relationship.—E. N. Munns.

377. REYES, TERESO. *La agricultura de Mexico esta en peligro de desaparecer a causa de la destrucción de los bosques*. [Mexican agriculture in danger of disappearing because of the destruction of the forests.] Rev. Agric. [Mexico] 6: 275-280, 338-343, 396-397. 4 fig. 1921.—Popular.—John A. Stevenson.

378. ROGERS, WALTER E. *Ice-storms and trees*. Torreya 22: 61-63. 1 fig. 1922.—Two ice-storms occurring in central Wisconsin in February and March, 1922, were studied with regard to their effect on forest trees. Twigs of 13 trees were compared as to increase in size due to ice, ranging from 950 per cent in *Tilia americana* to 226 in *Quercus alba*. Twigs of 21 species showed a weight of ice varying in its ratio to the weight of the twig from 132:1 in *Ulmus americana* to 5:1 in *Quercus rubra*. Leaves of *Q. alba* showed a weight of 44:1, and needles of *Pinus laricio* 95:1. Wide variation in amount of damage was observed.—J. C. Nelson.

379. SCHAEFFER, A. *Comment les forêts s'enrichissent*. [How forests enrich themselves.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 269-270. 1922.—Data are given to show the results of marking in the Haute-Saône in 1883-85 and in 1921. The number of coppice stems reserved on an area of 112,000 hectares has been increased from 72 to 82 per hectare, of small standards from 34 to 78, and of large standards from 5 to 10. At the same time the average number of trees sold and cut per hectare has been increased from 40 to 56. Thus the forestry ideal of increasing growing stock and at the same time increasing yield has been realized.—J. Kittredge, Jr.

380. SCHAEFFER, [A]. *La sylviculture en Haute-Saône*. [Silviculture in the Haute-Saône.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 244-248. 1922. [A verbatim reprint of a publication of the Agricultural office of the Prefecture of Haute-Saône.]—The forests of Haute-Saône occupy 31 per cent of its area. Most of them are managed as coppice under standards, which is particularly suitable for private owners because both saw timber and firewood are produced. Marking is the most important operation in these forests. Since charcoal wood has fallen in price, the marking of coppice trees to be reserved should be made heavier, up to 200 or 300 per hectare. All vigorous standards should also be reserved. Cleanings are very desirable where possible. In the small woods of high forests, thinnings should be made every 6 or 8 years, by which 2 or 3 times the production of wood can be secured. The introduction of fir in the coppice stands on poor sites in the mountains should be encouraged. A fir forest may always be expected to yield twice as much revenue as one of oak. The sterile, uncultivated fields of the hill country should be reforested with carefully selected species. Poplars can be planted to good advantage in marshy lands along streams.—*J. Kittredge, Jr.*

381. SEAMAN, L. N. Note on the relative strength of spruce red wood and spruce white wood (*Picea morinda*). Indian Forester 48: 34-42. Pl. 3-4. 1922.—Two tests were made to determine the strength of spruce for railway sleepers, one to determine spike-holding power, the other to establish strength, stiffness, and toughness. Red wood, the dense of the 2, proved the better for this purpose.—*E. N. Munns.*

382. SEURRE. *Les forêts françaises et les bois de papeterie*. [French forests and wood for paper pulp.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 229-236. 1922.—The French paper pulp industry consumes annually about 3,150,000 steres (stacked cubic m.) of wood. The French forests occupy at present an area of 10,100,000 hectares, of which 74 per cent is coppice and the rest high forest. The woods suitable for manufacture of paper pulp are spruce, fir, Scotch pine, black pine, Austrian pine, aspen, birch, poplars, and Eucalyptus. The fir and spruce forests have an area of 950,000 hectares, the average annual growth being 3-4 cubic m. per hectare; $\frac{2}{3}$ of this, —1,282,500 cubic m.,—would be available for paper pulp. The pine forests cover 285,000 hectares. Growth averages 3 cubic m. per hectare per year, $\frac{1}{3}$,—285,000 cubic m.,—being available for paper pulp. Aspen occurs in the proportion of $\frac{1}{10}$ in the coppice forests, occupying 3 million hectares. The growth of these forests is 2 cubic m. per hectare per year, and $\frac{1}{2}$ of the aspen,—300,000 cubic m.,—is available annually for paper pulp. Birch can furnish 80,000 cubic m. additional. Poplars will furnish 100,000 and Eucalyptus 20,000 cubic m., so that the total production of wood for paper pulp is estimated at 2,117,500 cubic m. as compared with a consumption of 2,079,000 cubic m. France may, therefore, be expected to be self-supporting in pulpwood production. A recent process indicates that maritime pine, after a preliminary extraction of the resin, can also be used for paper pulp. This would make available an additional 905,000 cubic m. of pulp wood.—*J. Kittredge, Jr.*

383. SPAETH, J. NELSON. Notes on the release of white pine in Harvard Forest, Peter-sham, Massachusetts. Jour. Forestry 20: 117-121. 1922.—Disengagement cuttings show a marked response in white pine as in 5 years the per cent of normal healthy trees increased from 39 to 51; where no cuttings were made the per cent dropped from 51 to 22. The general health of white pine when released showed 28 per cent improved and 44 per cent the same, while without release only 3 per cent were improved and but 14 per cent remained the same. Damage other than suppression is due to the loss of terminal growth by whipping, especially in the winter season. Release is most successful when the pines average about 12 feet in height for site 2.—*E. N. Munns.*

384. STEBBING, E. P. The forests of India and the development of the Indian Forest Department. Indian Forester 48: 81-98. 1922.—The early history of the forestry movement in India is traced with the causes which led to the changes in the forest management. The perfected organization has developed a great resource and made the service one that can stand as a model for the British Empire.—*E. N. Munns.*

385. SUTHERLAND, JOHN. **Forestry in its national and economic aspects.** Jour. Forestry 20: 93-105. 1922.—The lack of appreciation of the United Kingdom of forests was responsible for the great shortage of timber during the war. Forests were permitted to grow as remnants of an original culled forest in small patches or in still smaller areas as plantations of various native and exotic species. Recently the Forestry Commissions have been authorized to undertake a program of afforestation which in 10 years is to cover 150,000 acres. Altogether 1,770,000 acres are to be reforested and $\frac{2}{3}$ of this amount is recommended as the aim for the next 40 years. Private capital and enterprise are to be stimulated into caring for forests through perhaps some form of subsidy, relief from taxation, protection against fire, disease, and insects, which would call for regulation of cutting later. While this area would not satisfy all local demands, it would conserve shipping, help exchange, retain capital, and help to solve a problem of the development of rural areas.—E. N. Munn.

386. TRABUT, L. **Utilisation des Eucalyptus dans le Nord de l'Afrique.** [Utilization of eucalyptus in Northern Africa.] Bull. Sta. Recherches Forest. Nord Afrique 1: 202-210. 1921.—Eucalyptus woods, chiefly of *E. globulus*, grown in north Africa have met with unjustifiable disfavor. *E. rostrata*, *E. rudis*, *E. teretincornis*, and more rarely *E. punctata*, *E. collossea*, and *E. diversicolor* have been planted. As an example of the possibilities of Eucalyptus wood, the author gives the results of planting operations and successful utilization of different species of *Eucalyptus* in California, including use for railroad ties, marine piling, telegraph poles, boards, cabinet wood, and firewood. *E. occidentalis* var. *astringens* is being exploited largely in Australia for tannin, of which it yields more than *Acacia*. Eucalyptus is also useful for planting in wet and brackish soils. Crosses are frequently more resistant and grow more rapidly than the non-hybrid species. Recommendations are included of the most suitable species for planting in northern Africa.—J. Kittredge, Jr.

387. WALKER, A. H. **Thinning of deodar.** Indian Forester 48: 78-80. Diagr. 1922.—Measurements of deodar heavily thinned show that the tree can be released from suppression and that it will respond quickly to the stimulus of an open stand.—E. N. Munn.

388. WATIER, CH. **Les Cupressinées dans le Maroc méridional.** [Cupressineal in southern Morocco.] Bull. Sta. Recherches Forest. Nord Afrique 1: 222-240. 1921.—*Callitris quadrivalis*, *Juniperus phoenicea*, *J. oxycedrus*, *Cupressus sempervirens*, and *Argana sideroxyylon* form the most important part of the forest flora of southern Morocco. They occur under similar conditions and in the same localities, but usually with one or other of the species dominant. Each has a wide altitudinal range and is indifferent to aspect. Differences in the mineral constituents of the soil apparently account for the fact that in a good locality one of these species usually attains superiority and the others are eliminated. For each of the conifers a discussion is given of the characteristics of the tree and of the forests and their occurrence in the region. The forests of *Callitris* are the most important at present. Many of these forests are being heavily tapped for the resin, which is the basis for sandarac. The possibilities of exploiting these forests, the cultural operations which should be undertaken, the economic advantages, and the by-products,—particularly sandarac,—are discussed. A table is given of the exportations of this gum to foreign countries from 1913 to 1917.—J. Kittredge, Jr.

389. WEBSTER, A. D. **The Sitka spruce in Sussex.** Gard. Chron. 71: 79. 1922.—Notes are given on a planting of 14 acres made at Sussex about 1908.—P. L. Ricker.

390. WEIBECKE. **Ostdeutscher Kiefernwald. Seine Erneuerung und Erhaltung.** [East German pine forests. Their renewal and retention.] Zeitschr. Forst- u. Jagdw. 53: 294-305. 1921.—The subject of seed cultures is taken up under the sub-headings (1) soils upon which sowing can be done, (2) time of sowing, and (3) the seed. Sowing of forest seed is generally practicable. Poor results are avoided to the extent that sparse and valuable humus is conserved, collected, and mixed in the drill furrows. The necessity of planting occurs on only

about 10 per cent of the cultural areas. Soil impoverishment may be combated by (1) water conservation through early soil preparation, (2) prompt seasonal sowing in the spring, (3) packing of forest litter as a fertilizer. Pine seed must be in the soil by the 10th or 15th of April, when there is the desired soil moisture and temperature. Pine seed swells in 8-10 days at 10-15°C.; it germinates best when the sun heats the soil to 20-25°C. for a few hours daily. Nurseries should be sown about April 8 and planting done between March 25 and April 15, at the latest April 25. Only once in 31 culture years has the author lost an early sowing on a sunny site by frost-killing of the germinating seed. The best seed is obtained from cones allowed to open naturally, collected from fellings in advanced pole-wood and in mature stands. If stands have been thinned and branchy material removed, good origin and heritage is assured. Commercial seed extracting establishments often deliver seed of various germinative powers collected in different years, all intermixed. This is allowed as long as the guaranteed germinative power is obtained from the whole. It is recommended that every forest superintendent collect his own seed from fellings and thinnings in mature and pole stands over 60 years old. Cones collected earlier contain unripened seed.—*J. Roeser, Jr.*

391. WICKENHEISER, HERBERT C. Notes on a growth of young white birch. *Torreya* 22: 84-86. 1922.—A cinder-filled swamp area at the south end of Van Cortlandt Park in New York City is occupied by a growth of *Betula populifolia* Marsh. About 1000 trees are found over an area of 10 acres. The average height is 24½ inches, and diameter of stems 6 inches above the ground ¼ inch. The tallest are about 5 years old, dating back to the filling-in of the swamp. The nearest birch trees are about ½ mile to the north.—*J. C. Nelson.*

392. WILSON, ELWOOD. Forest mapping and estimating from aerial photographs. *Jour. Forestry* 20: 113-116. 1 fig. 1922.—A hydroplane was used in making a survey of 140 square miles of forest land away from communication. The flying done at 5000 feet gave very accurate results when checked against ground studies. Costs under this method were less.—*E. N. Munns.*

393. WOOD, B. R. Artificial regeneration of sal in Gorakhpur. *Indian Forester* 48: 53-67. 1922.—Sowing and planting of sal has been attempted for 8 years, and observations show that sal seed has considerable vitality if placed ¼-½ inch in moist earth. Without proper moisture sal lies in the soil several months before germinating. Root and shoot planting is a failure, but great success followed seed sowing in the forest. Sal apparently prefers full light and responds readily to it, though able to persist where the shade is not too heavy.—*E. N. Munns.*

394. WOOLSEY, T. S. JR. Public forestry on private land. *Jour. Forestry* 20: 130-134. 1922.—Forest devastation can probably be best stopped by direct federal control; the second best means is by federal cooperation with state agencies. But where unimproved forest land is neither being devastated nor intelligently managed there should be some method of state protection and improvement at the risk of the holder. An act for this purpose is given which provides for the necessary management of certain private land with and without the application of the holder; the return of the property after a minimum period with reimbursement of necessary outlays; the purchase of the land if the costs are not paid.—*E. N. Munns.*

395. WOOLSEY, T. S. JR. [Rev. of: BENSKIN, E. Afforestation in the United Provinces. Government Press: India, 1921.] *Jour. Forestry* 20: 146. 1922.—The erosion in the Gangetic Plain resulting from deforestation makes necessary reforestation methods similar to those used in the French Alps. Forest planting is progressing slowly and so far has been successful.—*E. N. Munns.*

396. WOOLSEY, T. S. JR. [Rev. of: BIOLLEY, H. E. L'aménagement des Forêts par la méthode expérimentale et spécialement la méthode du contrôle. (Forest management by the experimental method especially the method of control.) 30 p. Attinger: Paris, 1921.] *Jour.*

Forestry 20: 144-145. 1922.—The forests of silver fir should be managed as an experimental area and be constantly under observation in order to determine maximum growth.—*E. N. Munns.*

397. W[OLSEY], T. S. JR. [Rev. of: FISHER, RICHARD. T. **The management of the Harvard Forest, 1909-1919.** Harvard Forest Bull. 1. 27 p. 1921.] Jour. Forestry 20: 77-78. 1922.

398. W[OLSEY], T. S. JR., and R. Z[ON]. **Forest mensuration.** [Rev. of: CHAPMAN, HERMAN H. **Forest mensuration.** xxii + 553 p. J. Wiley and Sons: New York; Chapman & Hall Ltd.: London. 1921.] Jour. Forestry 20: 139-144. 1922.—The book is designed for school use and is far superior to other works so far published. Discussions of older methods and illustrations should be included in an appendix as some of the subject matter is apt to be confusing. The use of the board foot in American work is decidedly unfortunate as it brings into the mensuration work many difficulties in calculation.—*E. N. Munns.*

399. WRIGHT, H. L. **Forest fires caused by landslips.** Indian Forester 48: 110. 1922.—A fire was seen starting in dry grass which could have been caused only by sparks from falling rocks in a landslip.—*E. N. Munns.*

400. ZAVITZ, E. J. **Reforestation in Ontario.** Jour. Forestry 20: 18-24. 1922.—Two problems of reforestation are involved, private lands in southern Ontario, Crown lands in the Laurentian plateau. On private lands, remittance of taxes, education, demonstration areas, and tree distribution from governmental nurseries are responsible for a growing appreciation of what can be done. Municipal forests are being established, the management being turned over to the provincial foresters. On the Crown lands reliance has been placed on natural regeneration, but this has not proved sufficient and must be supplanted by artificial means.—*E. N. Munns.*

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 4, 11, 25, 27, 31, 32, 44, 74, 80, 85, 91, 96, 105, 108, 115, 182, 196, 197, 215, 227, 229, 304, 386, 486, 508, 509, 510, 515, 539, 655, 664, 687, 697, 703, 808, 830, 843, 913, 915, 923)

401. ANONYMOUS. **Growth and sex-factors of racial character.** Nature 109: 389. 1922.—An abstract is presented of a paper read by Miss R. M. FLEMING at the Royal Anthropological Institute Feb. 28, 1922, with report of a brief discussion.—*O. A. Stevens.*

402. ANONYMOUS. **Prof. Rolfs writes of unique citrus trees in Brazil.** California Citrogr. 7: 13. 1921.—P. H. ROLFS, in a letter to A. D. Shamel, describes briefly a "freak" orange tree found at Morro Velho, Brazil. Several branches bear fruits with "etiolated" or colorless segments, but the leaves are normal.—*Howard B. Frost.*

403. ANONYMOUS. **A new view of fertility.** [Rev. of: PELL, C. E. **The law of births and deaths: being a study of the variation in the degree of animal fertility under the influence of the environment.** 192 p. T. Fisher Unwin: London, 1921.] Nature 109: 267-268. 1922.

404. ADAMS, C. D. **Avocado varieties committee submits new report.** California Citrogr. 7: 310-311, 322. 1922.—In connection with descriptions of varieties it is stated that it is increasingly probable that the "ideal" type of avocado will result from hybridization between the Guatemalan and hardy Mexican types. Some such hybrids have already been produced.—*Howard B. Frost.*

405. ANDERSON, W. S. Vitality of spermatozoa. Kentucky Agric. Exp. Sta. Res. Bull. 239. 36 p. 1922.—(1) The vitality of the spermatozoa of some domestic animals. The semen of a fertile horse contains numerous active spermatozoa. When a number of inactive spermatozoa are present in semen, it is an indication of partial sterility. The presence of a considerable proportion of inactive spermatozoa is invariably an indication that a large percentage of females mated will not conceive. Certain males produce an abundance of sperms all inactive. A considerable number of males were found in which no sperms could be found in the semen. Under laboratory conditions at temperatures varying from 0 to 46°C. spermatozoa usually did not remain active for over 8 hours. The period of activity is only slightly greater after normal insemination. The addition of acid in small quantities to semen reduces the activity of the sperm. The average pH value of the semen of 7 normal males was 7.31 and of 5 sterile males 7.58. (2) The vitality of the spermatozoa of some sea animals. The spermatozoa of the oyster (*Ostrea virginica*) and the hard shell clam (*Venus mercenaria*) are immobile in the sex glands and the seminal fluid but become active in contact with sea water; sodium chloride is the activating agent. Dilute alkaline solutions are apparently not injurious to the spermatozoa. The spermatozoa are active in a 15 per cent solution of ethyl alcohol in salt solution. Very dilute solutions of acids are injurious to the spermatozoa.—W. D. Valleau.

406. BREMER, G. Een cytologisch onderzoek van eenige soorten en soorts-bastaarden van het geslacht *Saccharum*. [A cytological research of some species and species hybrids in the genus *Saccharum*.] Arch. Suikerindust. Nederland-Indië; Mededeel. Proefsta. Javasuikerindust. 1. 111 p., illus. 1922.—In growing sugarcane seedlings at the Sugar Experimental Station at Pasoeroean, Java, species hybridisation has been carried on for many years. Crossings were made between genuine wild species of *Saccharum* (for instance *S. spontaneum*) and the usually cultivated varieties of *S. officinarum*, but some wild varieties were also used which are probably species hybrids.—The author found that the species of this genus hitherto examined have different chromosome numbers, and that a classification based on the chromosome numbers corresponds with one based on outer morphological characteristics.—The author found that the haploid number of chromosomes in pollen mother cells of *S. spontaneum*, a wild growing species, is 56. The reduction division occurs in a normal way. In 5 special varieties of *S. officinarum*, which differ widely from one another in outer characteristics, the haploid number is 40, but frequently a varying number of these chromosomes do not conjugate in the pollen mother cells; these chromosomes remain univalent and surround the gemini in the equatorial plates. The partners of the bivalent chromosomes first pass to the poles; the univalents, lagging a little, divide into 2 parts, which also pass to the poles. Daughter cells thus result with a number of chromosomes larger than the true haploid number. Probably by the homotypic division the pollen grains also get a number of chromosomes larger than 40.—*S. officinarum* often shows a high male sterility. To the author it seems not improbable that a relation exists between this sterility and the abnormal chromosome numbers and combinations in the pollen cells.—A preliminary research showed that 2 Dutch-Indian varieties of *Saccharum*, with the vernacular names of Loethers and Teboe hitam Rokan, differing in outer characteristics somewhat from *S. officinarum*, have other chromosome numbers than that of the latter species. Two varieties from British India, Chunnee, and Puckree, also differing from *S. officinarum* have = 46 haploid chromosomes.—In species hybrids of other genera which have been investigated up to the present the number of chromosomes proved generally to be the total of the haploid numbers of the parents.—Highly fertile hybrids of *S. officinarum* × *S. spontaneum* are easily obtained. Male sterility is rarely found, female sterility never. The author found that the somatic chromosome number of several of these hybrids was 136, the total of the diploid chromosome number of *S. officinarum* and the haploid number of *S. spontaneum*. Normal reduction division occurs, the haploid number being 68. The author thinks it probable that the normal reduction division may be the reason of the fertility of these hybrids. From morphological studies carried on at the same experiment station the conclusion had already been reached that the wild Kassoe cane was a hybrid of *S. spontaneum* and *S. officinarum*. The haploid chromosome number of Kassoe proved to be 68, in full accord with the number found in artificial crossings between these species.—In the megaspore

mother-cells of *S. officinarum* a normal reduction division was seen, from which the author concludes that a longitudinal splitting of the *S. officinarum* chromosomes in the egg cell during fecundation may be responsible for the increase in the number of chromosomes of the hybrid plants. In this case heterotriploid hybrids could be spoken of.—The volumes of the nuclei of the pollen mother-cells of *S. officinarum*, *S. spontaneum*, and *S. officinarum* \times *S. spontaneum* are in accordance with the chromosome numbers.—*J. Kuyper*.

407. BUCHHOLZ, JOHN T., and A. F. BLAKESLEE. Studies of the pollen tubes and abortive ovules of the Globe mutant of *Datura*. *Science* 55: 597-599. 1922.—In *Datura* the $(2n + 1)$ Globe mutant complex is transmitted to less than 3 per cent of the offspring by the pollen, although half the pollen receives the extra chromosome. Similar segregation is indicated for the ovules. One-fourth the offspring of Globe \times normal are Globes, but abortive ovules account for the missing Globes and make a 1:1 ratio. Thus there is greater mortality of Globe zygotes. Counts of abortive ovules in crosses made with Globes and normals suggest that 4-10 per cent of $(n + 1)$ pollen tubes enter the ovary. The authors' technique in counting and measuring pollen tubes in the styles is described. Distributions of pollen tubes in normals and Globes are shown as unimodal and bimodal curves respectively. In the Globes there is a faster- and a slower-growing group of pollen tubes, the latter probably the $(n + 1)$ group. There seems to be a selection between male gametophytes, this and other processes of developmental selection tending to cause the $(2n + 1)$ mutant to disappear.—*J. Lincoln Cartledge*.

408. DAHLGREN, K. V. OSSIAN. Selbststerilität innerhalb Klonen von *Lysimachia Nummularia*. [Self-sterility within clones of *Lysimachia Nummularia*.] [Abstract.] *Hereditas* 3: 200-210. 1922.—Several writers have asserted that *Lysimachia Nummularia* never, or extremely rarely, produces capsules. By pollination between individuals from different parts of northern and central Europe, it is now demonstrated, however, that fruits can sometimes be produced without difficulty. That this occurs so seldom in nature is due to self-sterility, and to the fact that all plants at a locality generally are members of the same clone. [See also Bot. Absta. 9, Entry 225.]—*K. V. Ossian Dahlgren*.

409. ELORDUY, SAMUEL TORRES. El mejoramiento del maíz. [Improvement of corn.] *Rev. Agric. [Mexico]* 6: 673-676. 6 fig. 1922.—Methods applicable in improving the corn crop of Mexico are popularly discussed.—*John A Stevenson*.

410. EULER, H. V., und INGYAR LAURIN. Zur Kenntnis der Hefe *Saccharomyces Thermantitonus*. [The yeast *Saccharomyces Thermantitonus*.] *Biochem. Zeitschr.* 102: 258-267. 1920.—The rate of growth, fermenting and inverting ability of a strain of *Saccharomyces Thermantitonus* grown in Berlin for 15 years on beer wort at 16°C. were determined. As the upper temperature limit for growth and the optimal temperature for fermentation are lower than in the original strain accustomed to high temperatures, it is concluded that adaptation to the new environment has occurred.—*H. D. Hooker, Jr.*

411. HAGEDOORN, A. L., und A. C. [HAGEDOORN]. Species crosses in rats. *Zeitschr. Indukt. Abstamm. u. Vererb.* 29: 97-121. 1922.—Descriptions of *Mus alexandrinus*, *M. rattus*, *M. tectorum*, and of house rats and tree rats of Java are presented, with notes on offspring resulting from certain crosses involving these forms. The characters considered in this series of matings are: light and dark belly color; black, agouti, yellow, silver, and chocolate coat color; white tail tip; and waltzing gait. Other characters, which occurred among field rats of Java and Sumatra, are discussed, namely, cream with black eyes, pale agouti and roan coat colors, and albinism. It is the authors' contention that new types arise by recombination of recessive determiners, as *aabb* from across between *AAbb* and *aaBB*, rather than by mutation.—*H. W. Feldman*.

412. HARDIN, W. L. Outline of work in interest of avocado industry. *California Citrogr.* 7: 294, 314-315. 1922.—A popular discussion of the need for systematic breeding of the

avocado and of the characteristics to be considered. The author especially stresses the variability of the avocado in protein content and its potential value as a source of protein. "Bud-selection" work is favored. One case of probably genetic somatic variation has been reported; a tree of the Ganter variety regularly produces black fruit on one branch.—Howard B. Frost.

413. HOOPER, J. J. **Studies of dairy cattle.** Kentucky Agric. Exp. Sta. Res. Bull. 234. 91-161. 1921.—(1) Inheritance of color markings in Jersey cattle. Sixty-six per cent of Jersey cattle are solid in color and have black tongues and switches, 12 per cent are broken in color with white tongues and switches, and 22 per cent have various combinations of color of the 3 units. Solid body color is dominant over broken, black tongue over white, and black switch over white. Apparently gray color is dominant to all other coat colors of Jersey cattle. (2) Influence of oestrus or heat on the production of milk and butter fat. J. J. Hooper and P. E. Bacon. No very decided fluctuation occurs during the period of heat. (3) Influence of age and pregnancy on the production of milk and butter fat in Jersey cows. Cows carrying a calf were found to produce slightly less milk. Young cows produce less milk and butter fat than mature cows. (4) The escutcheon in relation to production of milk and butter fat. An inspection of 1117 dairy cows shows that the seldedge type of escutcheon predominates among Jerseys while the Flandrine type is most common with Holsteins, Guernseys, Ayrshires, and Kerrys. No correlation was found between escutcheon type and milk and butter fat production. (5) The body secretions in relation to production of milk and butter fat. No correlation was found between the amount and color of body secretions found on the escutcheon, in the ears, and between the udder and thighs of dairy cattle, and milk and butter-fat production.—W. D. Valleau.

414. JEFFREY, E. C., A. E. LONGLEY, and C. W. T. PENLAND. **Polyploidy, polyspory and hybridism in the angiosperms.** Science 55: 517-518. 1922.—From investigation of known hybrids or species belonging to groups in which a great deal of natural hybridism is suspected, the conclusion has been reached that polyploidy (multiplication of the normal gametophytic number of chromosomes by 3, 4, etc.) is a common result of incompatible species crosses. In polyspory, which frequently accompanies polyploidy, the spore mother-cell, on account of irregular distribution of chromosomes at the 1st division, gives rise to more than 2 daughter nuclei,—generally 2 larger nuclei and as many as 4 smaller ones. After the 2nd division, 4 usually normal pollen grains and several small abortive grains result. Emphasis is placed upon abortive pollen which along with gigantism, mutability, polyploidy, and polyspory is offered as a morphological criterion of genetic impurity or heterozygosis in plants. A fuller publication is promised.—A. F. Blakeslee.

415. MAYER GMELIN, H. **Over Entbastaarden. [On graft hybrids.]** Culture 34: 205-216. 6 fig. 1922.—Graft hybrids were obtained of *Solanum Lycopersicum* with *S. nigrum* and with *S. Dulcamara*. No success was gained by reciprocally grafting *S. tuberosum* with *Phydelis Francheti*, *Solanum Melongena*, *S. Lycopersicum*, *S. nigrum*, *Nicotiana glauca*, *Atropa Belladonna*, and *Datura Stramonium*. Periclinal and sectorial chimeras were obtained, the latter in the largest quantities. Indirectly, periclinal chimeras may be produced by sectorial chimeras. A suggestion is made of grafting more than 2 individuals, though the results may be smaller. If in the periclinal chimera the epidermis is produced by 1 component, the roots formed on cuttings will belong to the other component, since roots usually originate endogenously.—J. C. Th. Uphof.

416. RAWES, A. N. **Pollination in orchards (V).** Jour. Roy. Hort. Soc. 47: 8-14. 1922.—This paper reports work with apple varieties grown in plots in a glass house and is a continuation of work previously reported. Fifty varieties have been experimented with of which 8 are classed as self-fertile, 39 partly self-sterile, and 3 entirely self-sterile. Self-fertile varieties set fruit more freely when pollinated with pollen from other varieties. No instances of cross sterility have been discovered in apple varieties. The blooming periods of 10 varieties are

shown, and sufficient differences between early and late blooming varieties to interfere with cross pollination were found.—*J. K. Shaw.*

417. SHAMEL, A. D. **Florida undertakes systematic citrus bud-selection work.** California Citrogr. 7: 102, 127. 3 fig. 1922.—The Florida Agricultural Experiment Station has established a branch station primarily for work on "bud selection" and "stock selection" in citrus fruits, in cooperation with the U. S. Department of Agriculture. The author reports that the Alabama plantings of the Owari variety of "Satsuma orange" include "twelve or fifteen distinct strains."—*Howard B. Frost.*

418. SHAMEL, A. D. **Relation of apple bud selection to citrus-fruit improvement.** [Includes rev. of: DAVIS, M. B. The possibility of the transmission by asexual propagation of the high yielding ability of individual apple trees. Sci. Agric. 2: 120-124. 1921.] California Citrogr. 7: 112-113. 1922.—The reviewer states that he has found "much larger gains from propagation from superior parent citrus trees than those reported in the apple paper," and attributes this difference to selection from a larger number of trees in the citrus work. Citrus shows very distinct bud-variation strains within the commercial varieties.—*Howard B. Frost.*

419. SPRENGER, CARL. **Iris-Züchtung und Iris-Verwendung.** [Iris breeding and Iris improvement.] Gartenwelt 26: 270-271. 1922.—A general consideration of breeding and raising Iris as conducted by the author on the island of Corfu is presented. The following Iris hybrids are described: *Iris Jokaste* (*I. atropurpurea* × *I. susiana*), *I. Antigone* (*I. atropurpurea* × *I. Bismarckiana*), *I. Hippodamia* (*I. atropurpurea* × *I. susiana*), *I. Aerope* (*I. atropurpurea* × *I. susiana*), *I. Klytemnestra* (*I. atropurpurea* × *I. Saarii lurida*), *I. Iphigenia* (*I. atropurpurea* × *I. Saarii lurida*), *I. Electra* (*I. Saarii* × *I. susiana*), *I. Juno* (*I. Saarii lurida* × *I. iberica*), *I. Minerva* (*I. Saarii* × *I. iberica*), *I. Ceres* (*I. Saarii* × *I. Madonna?*), and *I. Latana* (*I. Saarii* × *I. iberica*).—*J. C. Th. Uphof.*

420. STOMPS, THEO. J. **De Stoffelijke basis der erfelijkheid bij planten en dieren.** [The material basis of heredity in plants and animals.] 270 p., 24 fig. Haarlem, 1922.—The writer gives a popular review of our present knowledge of the nucleus in relation to the phenomena of heredity. He considers mitosis as a kind of osmotic process. Size and difference in appearance between chromosomes of the same nucleus is most simply explained by supposing that the chromosomes are entirely independent organs with distinct external properties. An abnormal number of chromosomes is considered the cause of cancer.—*J. C. Th. Uphof.*

421. TOENNIENSEN, E. **Über die Vererbung der Alkaptonurie des Menschen.** [On the inheritance of alkaptonuria in human beings.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 26-30. 1922.—Alkaptonuria is a condition in man in which the amino acids phenylalanin and tyrosin are not completely destroyed, causing arthritis and deposition of pigment in the cartilages. They are also found in the urine, causing characteristic coloring and deposits. A review of the cases of alkaptonuria already reported showing inheritance of the disease is made and charts are given. Summary of these data shows that the number of unaffected individuals in relation to those affected is as 3:1. These cases are small in point of number. This condition is not restricted to one sex and can be transmitted by either parent. No cases in which both parents are affected are reported. In 1 case quoted from Umber, 1 affected male, with no affected sibs, mated in an out blood to a non-affected female, produced 4 affected and 4 non-affected offspring. This the author considers a *RR* × *DR* mating because of the proportions. His conclusion is that alkaptonuria rests upon a recessive character and is not in the X chromosome as it is not sex-linked. This agrees with the physiological knowledge that the condition exists because of the absence of a ferment.—*A. H. Estabrook.*

422. VALLEAU, W. D., and E. J. KINNEY. **Strains of standup White Burley tobacco resistant to root-rot.** Kentucky Agric. Exp. Sta. Circ. 28. 18 p., 6 fig. 1922.—Tobacco root-rot caused by *Thielavia basicola* is the most serious disease of tobacco in the Burley section of

Kentucky. A discussion of the nature of root-rot, its effect on cultural practices and methods of control are considered. Growing of resistant varieties is thought to be the best method of control. The so-called Burley variety of tobacco is shown to be made up of a large number of distinct strains which breed fairly true although the progeny of some plants show distinct segregation. Selections of "standup" types of Burley have been made which appear to be very resistant to root-rot and of the desired "standup" type and of high quality. These are being tested commercially. Selection is being continued.—*W. D. Valleau.*

423. Y., G. U. *Statistical method.* [Rev. of: JONES, D. C. *A first course in statistics.* ix + 286 p. G. Bell and Sons: London, 1921.] *Nature* 109: 473-474. 1922.

HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issue Entries 58, 134, 173, 174, 210, 285, 348, 373, 402, 404, 412, 416, 419, 672, 689, 690, 691, 692, 760, 831, 832, 888, 918)

FRUITS AND GENERAL HORTICULTURE

424. ANONYMOUS. *Raspberries tried at Wisley.* *Jour. Roy. Hort. Soc.* 47: 43-49. 1922.—Stocks representing 29 summer-fruited and 14 autumn-fruited varieties were tested and awards made by the Fruit and Vegetable Committee. Keys to the varieties and brief descriptions are given.—*J. K. Shaw.*

425. ANONYMOUS. *Strawberries tried at Wisley 1920-21.* *Jour. Roy. Hort. Soc.* 47: 50-55. 1922.—One hundred stocks representing 65 varieties of strawberries were tried and awards made. Owing to abnormal conditions no classification was attempted, but a table showing varietal characteristics and descriptions and notes of the several varieties are given.—*J. K. Shaw.*

426. ANONYMOUS. *The Barham Court peaches.* *Gard. Chron.* 70: 234. 1921.—These peaches were grown at Maidstone and exhibited at all important English exhibits a generation ago by Mr. Woodward, but now are rarely seen. The crop this season yielded about 17,000 fruits, the majority weighing 10-12 ounces. Mr. Woodward believes in young, vigorous trees and is constantly replanting during October and early November, using an abundance of wood ashes and top dressing. Duke of York is favored for early crops, and Hale's Early followed by Peregrin, Sea Eagle, and Nectarine Peach for late crops.—*P. L. Ricker.*

427. ARNOLD, W. S. *The lemon.* *Agric. Gaz. New South Wales* 33: 437-441. 1922.—In these practical cultural instructions particularly for the Kurrajong region, it is recommended that trees be fertilized by "soiling" (application of bush-land dirt) rather than by commercial fertilizers. It is suggested that the Australian native Kumquat, *Eremocitrus glauca*, be used as stock for grafting.—*L. R. Waldron.*

428. AUCHTER, E. C. *Pruning and nitrogen studies in a devitalized peach orchard.* *Proc. Amer. Soc. Hort. Sci.* 18: 178-193. 1921 [1922].—Devitalized peach trees 10 years old can be profitably rejuvenated by proper methods of soil management, spraying, worming, fertilizing, and pruning. Although good methods of soil management, worming, spraying, and applications of nitrate of soda have improved the general health of these trees, best results were not attained without some pruning. A moderately heavy pruning (cutting back into 3- or 4-year-old wood) gave best results. A moderately heavy pruning lowered the head of the tree noticeably, and in 2 years a new top was formed and vigorous growth stimulated through the lower parts of the tree. Trees in this condition should produce maximum crops for 6 or 8 years if properly managed. Although the partially pruned trees were stimulated so that

certain of the limbs will probably bear a fair crop, the growth on the dehorned limbs was so unsatisfactory that the gradual rebuilding of the tree was not attained. Provided each tree had enough main limbs to start with, so that a stub or two could be sacrificed without seriously impairing the shape, this method would, no doubt, be better than lightly pruning the tree and it might possibly equal the heavily pruned tree in yield over a 6- or 8-year average. The completely dehorned trees made a very dense, vigorous growth during both years, and were considerably dwarfed, and only a small number of fruit buds were formed on the long, over-vegetative shoots. This method was not so good as moderate pruning. With moderate or light pruning in the future, these trees will, no doubt, produce several profitable crops. Although light pruning produced a certain amount of stimulation in growth and fruit during the 2 years, it is very questionable whether the average production from trees so pruned will be enough in the next 6 years to justify use of the ground.—*W. E. Whitehouse.*

429. BALME, JUAN. **Un frutal japonesa de porvenir para la region subtropical de Mexico.** [A promising Japanese fruit for the subtropical region of Mexico.] *Rev. Agric. [Mexico]* 6: 516. 1921.—The author recommends the culture of the Japanese persimmon [*Diospyros Kaki*] in subtropical Mexico.—*John A. Stevenson.*

430. BARAKZAI, MAHOMED U. F. **Fruit culture as practised near Shikarpur, Sind.** Bombay Presidency Dept. Agric. Bull. 98. 14 p. 1920.—Shikarpur is on the western edge of the Sind Desert, India. The notes cover the propagation, irrigation, cultivation, flowering, yield, fruit preparation, pests, and local uses of the produce of the date (*Phoenix dactylifera*), pomegranate (*Punica Granatum*), crab apple (*Pyrus Malus*), guava (*Psidium Guajava*), and pharwan (*Grewia asiatica*).—*Robert L. Pendleton.*

431. BARTLETT, REG. G. **Better bananas. How to de-sucker to get them.** *Agric. Gaz. New South Wales* 33: 429-431. 2 fig. 1922.—Practical instructions are given.—*L. R. Waldron.*

432. BEATTIE, W. R. **The city home garden.** U. S. Dept. Agric. Farmers' Bull. 1044. 39 p., 16 fig. 1919.—This is a popular bulletin dealing with preparation of soil, tools, crops for the garden and their care. A table is appended giving the earliest and the latest safe dates for planting various vegetables in the open.—*C. G. Vinson.*

433. BECKETT, E. **Peaches and nectarines in the open.** *Gard. Chron.* 70: 139. Fig. 57. 1921.—The author gives notes on English cultural methods and conditions.—*P. L. Ricker.*

434. BIOLETTI, FREDERIC T. **Replacing missing vines.** *California Agric. Exp. Sta. Circ.* 249. 1922.—A loss of 27.8 pounds due to a missing muscat was accompanied by 5.6 pounds additional crop on the 2 neighboring vines, a compensation of about 20 per cent. For a missing Sultanina the compensation was 43 per cent. The filling of such gaps by the method of layering is recommended.—*A. R. C. Haas.*

435. BIOLETTI, FREDERIC T. **Vine pruning systems.** *California Agric. Exp. Sta. Circ.* 245. 4 p. 1922.—The systems best adapted to the conditions of grape growing in California are considered in 3 groups, head pruning, cane pruning, and cordon pruning; the advantages of each are explained.—*A. R. C. Haas.*

436. BLACKBURN, R. E. **Satsuma orange.** *Georgia State Coll. Agric. Circ.* 76. 4 p. 1918.—General directions are given for planting and handling this fruit in Georgia.—*T. H. McHatton.*

437. BRIERLEY, W. G. **Notes on the length of life of apple trees in Minnesota.** *Proc. Amer. Soc. Hort. Sci.* 18: 211-213. 1921 [1922].—The average apple tree in Minnesota commences bearing 6-8 years after planting, reaches its maximum production at about 20 years, then gradually fails. Apparently this is due mainly to climatic effects. Replies to a question-

naire sent to leading orchardists indicate that none of the common hardy varieties withstand Minnesota winters for 40 years. The length of life of these varieties is directly correlated with their hardness.—*W. E. Whitehouse.*

438. BUNYARD, EDWARD A. **The winter study of fruit trees.** Jour. Roy. Hort. Soc. 47: 18-25. Pl. 8. 1922.—Since deciduous fruit trees are, for fully half a year, without leaves or flowers the woody parts have been examined for characters of assistance in identifying varieties. Moderately vigorous 1-year shoots from an exposed part of the tree are best. Characters considered are stoutness, degree of curving between the buds, internode length, color, hairiness, lenticels, and various peculiarities of both fruit- and leaf-buds. The form of adult trees is also of value. These characters in different varieties of apple, pear, cherry, and plum are discussed.—*J. K. Shaw.*

439. BURNS, W., and S. H. PRAYAG. **The book of the mango.** Bombay Dept. Agric. Bull. 103. 98 p., illus. 1920.—The authors' experiments on many phases of mango production and handling are described, as well as the results of other workers in India and in other mango-growing countries.—The treatment by chapters, is as follows: (1) The history of mangoes, their distribution through the world, suitable soils, climates, and altitudinal ranges; (2) propagation methods, including cuttings, layering, grafting, budding, and top-working; (3), planting, covering distances between trees, season, and care; (4) subsequent care, as manuring, irrigation, pruning, and inter-crops; (5) harvesting, packing, and marketing, including ripening, sale of crop on the trees, and export possibilities; (6) transport of trees, scions, and seeds, both for short and long distances and ocean shipments; (7) unsatisfactory plantations, discussing especially sterility and renovation of neglected groves; (8) time and methods of pollination; (9) pests and diseases.—insect, fungous, and others; (10) uses of the mango; (11) classification, proposing an artificial system based on fruit characters.—An appendix includes spray formulas and a descriptive list and illustrations of the fruits of 89 varieties of Bombay Presidency mangoes.—*Robert L. Pendleton.*

440. CHURCH, G. G., and E. M. CHASE. **Some changes in the composition of California avocados during growth.** U. S. Dept. Agric. Bull. 1073. 1922.—No satisfactory correlations were found between physical properties and maturity. The proportion of many of the constituents changes during development with marked increase in fat content. This takes place rapidly while the fruit is immature, much more slowly as it approaches maturity, accompanied by a decrease in sugar content. Fruits rich in fat contain at least 70 per cent on a water free basis at maturity. On storage of immature fruits there is an apparent increase in the proportion of fat and decrease in sugar content while mature fruits do not show this increase to the same extent. No standards of maturity are recommended.—*J. T. Buchholz.*

441. COLE, W. R. **Extension work in apple storage in Massachusetts.** Proc. Amer. Soc. Hort. Sci. 18: 130-135. 1921 [1922].—This report shows the present status of storage work among Massachusetts fruit growers. Common and air-cool storage on the farm, as practiced by a number of growers, means the utilization of existing cellars, or the construction of cellars for apple storage. The principles involved in this type of storage are discussed, and directions are given for utilizing old cellars.—*W. E. Whitehouse.*

442. CRANE, H. L. **Observations on the factors influencing the length of life of apple trees in West Virginia.** Proc. Amer. Soc. Hort. Sci. 18: 207-211. 1921 [1922].—The short life of apple trees in West Virginia is due primarily to shallow soils low in the elements of fertility; to the prevalence of diseases and insect pests; to climatic conditions, which seem to favor rapid development of trees and provide conditions in some cases almost ideal for diseases and insect pests; lastly to the varieties now grown, which come into bearing early and each year bear heavy crops, which exhausts the soil and weakens the trees.—*W. E. Whitehouse.*

443. CULLINAN, F. P. **Root development of the apple as affected by cultural practices.** Proc. Amer. Soc. Hort. Sci. 18: 197-203. 1921 [1922].—This paper contains observations on the

root development of Grimes apple trees after growing 8 seasons under sod, straw mulch, and tillage soil-management methods. The root systems of the trees under cultivation were quite symmetrical, spreading into all parts of the soil surrounding the trees. The main roots were found to a greater depth than those from the trees in the straw mulch or sod plots.—The trees under straw mulch had a shallow root system.—The trees in the sod made only a small growth but the root system as a whole did not come so near the surface as the roots under the straw mulch. A discussion of the factors influencing root development under these conditions is given.—*W. E. Whitehouse.*

444. DORSEY, M. J. **Hardiness from the horticultural point of view.** *Proc. Amer. Soc. Hort. Sci.* 18: 173-178. 1921 [1922].—This paper presents a study of the limitations of the variety as compared with the species from the hardiness standpoint. Investigation showed that with the species there are distinct regional types, individual variations, and that plants from the northern and southern part of the range of distribution may vary greatly in hardiness. The variety on the other hand may have some definite limitations as to plant characters or hardiness when compared with the species. Differences in the individual should be kept in mind in studying adaptation just as clearly as those in variety and species.—*W. E. Whitehouse.*

445. DURUZ, WILLIS P. **Harvesting and handling apricots and plums for eastern shipment.** *California Agric. Exp. Sta. Circ.* 239. 24 p., fig. 1-21. 1922.—Information and data obtained from successful growers of these fruits are given.—*A. R. C. Haas.*

446. DURUZ, WILLIS P. **Harvesting and handling California peaches for eastern shipment.** *California Agric. Exp. Sta. Circ.* 241. 21 p., fig. 1-11. 1922.—The problems concerned with the harvesting and packing of California peaches, together with the costs involved, are considered in detail.—*A. R. C. Haas.*

447. DURUZ, WILLIS P. **Harvesting and handling California pears for eastern shipment.** *California Agric. Exp. Sta. Circ.* 240, 19 p. 1922.—Directions are given for harvesting and packing California pears for eastern shipment.—*A. R. C. Haas.*

448. FICHTER, G. **Weiteres zur Unterlagen-Frage im Obstbau.** [The question of stocks in pomology.] *Möllers Deutsch. Gärt. Zeitg.* 37: 173-175, 184-187. 7 fig. 1922.—In various types of stocks there is much difference in root development, which the author considers very important. Doucin I is considered the best, Doucin III is suitable for heavy growers such as Boskoop, Lebel, and Pontoise. Of Paradise stock the Yellow Metz is mentioned. Quince I as stock gives an upright growth to Pastor pear, Beurré Diel, and Blumenbach, whereas on Quince II they develop hanging branches. Under apple seedlings Höhenheimer, Frierscher Weinapfel, Rheinischer Bohnapfel are relatively constant and suitable as stock. Pears can be well grown on seedlings of Champagner Brat, Palmisch and Knaus.—*J. C. Th. Uphof.*

449. FREEMAN, W. G. **The avocado in Trinidad and Tobago.** *Bull. Dept. Agric. Trinidad and Tobago* 18: 113-124. 1919.—The writer describes the avocado (*Persea gratissima*) as to early history in the West Indies, common names, present distribution and cultivation. A table is given showing its comparative food value with that of other foods.—*Florence A. McCormick.*

450. GAJÓN, CARLOS. **Como plantar los arboles frutales.** [How to plant fruit trees.] *Rev. Agric. [Mexico]* 6: 391-395, 452-457. 30 fig. 1921.—A popular discussion is presented of varietal selection and propagation of the peach, fig, apple, nectarine, plum, pear, persimmon, and other fruits in Mexico.—*John A. Stevenson.*

451. GAJÓN, CARLOS. **El mamey.** [The mamey apple.] *Rev. Agric. [Mexico]* 6: 517-519. 4 fig. 1921.—The author discusses the planting, culture, pruning, and uses of *Lucuma mammosa*.—*John A. Stevenson.*

452. GARDNER, VICTOR RAY, FREDERICK C. BRADFORD, and H. D. HOOKER, JR. **Fundamentals of fruit production.** 686 p., 70 illus. McGraw-Hill Book Co.; New York, 1922.—This book is a text and reference work for college students but will also find ready use among progressive fruit growers. It "attempts to focus attention on the conditions which make the fruit plant profitable; practices are considered only as they affect these conditions, not as ends in themselves. . . . Plant physiology, soil chemistry, soil science and physics have been requisitioned freely and advisedly, in no case, however, without an indication of applicability to pomology." The following chapter heads indicate the subjects treated: The water requirements of fruit plants; the intake and utilization of water; orchard soil management methods and moisture conservation; soil moisture, its classification, movement, and influence on root distribution; the response of fruit plants to varying conditions of soil moisture and humidity; pathological conditions associated with excesses and deficiencies in moisture; plant nutrients and their absorption; individual elements; manufacture and utilization of carbohydrates; the initiation of the reproductive processes; surpluses and deficiencies; the application of nitrogen-carrying fertilizers; fertilizers, other than nitrogenous, in the orchard; growing season temperatures; winter killing and hardiness; winter injury; winter injury to the roots; winter injury in relation to specific fruits; the occurrence of frosts; protection against frost; growing and fruiting habits; pruning, the amount or severity; pruning, the season; pruning with special reference to particular fruits; the structures and processes concerned in fruit setting; unfruitfulness associated with external factors; factors more directly concerned in the development of the fruit; fruit setting as an orchard problem; the reciprocal influences of stock and scion; the root systems of fruit plants; the geography of fruit growing; orchard locations and sites; orchard soils. A glossary is appended.—J. H. Gourley.

453. GIFFORD, F. R. **Converting the farm orchardist.** Proc. Amer. Soc. Hort. Sci. 18: 114-118. 1921 [1922].—This is a report of the peculiar problems encountered in extension work among orchardists in Wisconsin, where at least 75 per cent of the trees are in farm orchards, a large part of which are neglected. The method of carrying on extension work and the success attained by this method are discussed.—W. E. Whitehouse.

454. GIROLA, CARLOS D. **Cultivo de la yerba maté.** [Cultivation of "yerba maté."] Bol. Ministerio Agric. Nación [Argentina] 26: 129-142. 1 fig. 1921.—Paraguay tea or "yerba mate" (*Ilex paraguariensis* St. Hil.) has been much confused by some botanists with related species. Various varieties are recognized in Paraguay, the most important of which are *obtusifolia*, *acutifolia*, and *angustifolia*. Numerous other species of *Ilex* are used throughout South America for tea making. Brief notes covering botanical characteristics and the quality of the drink prepared from each are given.—John A. Stevenson.

455. GOKHALE, V. G. **Palm gul (sugar) manufacture in the Bombay Presidency (India).** Bombay Presidency Dept. Agric. Bull. 93. ii + 66 p., 11 pl. 1919.—The coconut palm (*Cocos nucifera*), date palm (*Phoenix sylvestris*), and palmira palm (*Borassus flabelliformis*) are the more important palms of the Presidency.—In western India, toddy, a fermented drink is the only product of date palm juice. This bulletin is a study of the attempts made to introduce the Bengal method of making sugar from the fresh juice of date palm. Attention must be given to the use of lime, formalin, or the smoking out of the collecting pots to inhibit rapid fermentation; the boiling of the juice promptly after collecting; and the adoption of the more efficient Bengal methods of tapping, which will greatly decrease labor costs and increase the yield per tree. The output of fresh juice per tree per season (November-April) averages 17 imperial gallons, making 22 pounds of dark brown sugar. Unsuccessful experiments are reported on the use of a cheap acid to produce a lighter colored sugar. Illustrations and full details of tapping methods are given. There are numerous tables of analytical and sugar-making data.—There is not much probability that a sugar-making industry could use palms other than *Phoenix*. According to current prices palm-sugar making would be profitable only as a cottage or supplementary industry.—Robert L. Pendleton.

456. GOULD, H. P., and FRANK ANDREWS. **Peaches: production estimates and important commercial districts and varieties.** U. S. Dept. Agric. Bull. 806. 34 p., fig. 1-7. 1919.—The important commercial varieties and districts are given by states.—C. G. Vinson.

457. GOULD, H. P., and FRANK ANDREWS. **Pears: production estimates and important commercial districts and varieties.** U. S. Dept. Agric. Bull. 822. 16 p., fig. 1-9. 1920.—This publication gives the important commercial varieties and districts by states.—C. G. Vinson.

458. GOURLEY, J. H. **Text-book of pomology.** xv + 380 p., 8 pl., 40 fig. Macmillan Company: New York, 1922.—This volume is published in the Rural Text-Book Series, edited by L. H. Bailey. The purpose of the book "is to present the experimental and investigational bases of fruit-growing on the physiological side." The work represents an effort to provide a text suitable for college students who are already familiar with general orchard practice. Limited data in tabular form are offered as support for the conclusions throughout the work.—The following chapter headings indicate the scope of the book: Composition of fruits; buds of fruit-trees; differentiation of flower-buds; factors which influence fruit-bud formation; pruning; thinning of fruit; orchard soils; cultural methods in orchards; fertilizers and manures for the orchard; relation of climate to pomology; winter injury; pollination and the sterility problem; the origin and improvement of fruit; propagation and fruit-stocks; and storage of fruit.—J. H. Gourley.

459. HARRISON, G. H. **The most profitable varieties of peaches, cherries and apples for Maryland conditions.** Rept. Maryland Agric. Soc. 5: 295-302. 1920 [1921].

460. HILTS, R. W., and R. S. HOLLINGSHEAD. **A chemical study of the ripening and pickling of California olives.** U. S. Dept. Agric. Bull. 803. 24 p., pl. 1-6, fig. 1-9. 1920.—This bulletin gives the percentage of solids, oil, protein, and ash in the flesh and pits of fresh and ripe olives of various varieties. It was found that the percentage of oil in the fruit flesh is the best index to maturity for olives, both fresh and pickled.—Carl G. Vinson.

461. HOWARD, W. L. **The apricot in California.** California Agric. Exp. Sta. Circ. 238. 53 p., fig. 1-2. 1922.—A rather complete summary is given of the data regarding the cultivation, irrigation, pruning, thinning, spraying, disease and insect pests, frost protection, harvesting, and the costs involved in the growing of apricots in California.—A. R. C. Haas.

462. ITIÉ, GABRIEL. **Datos complementarios sobre el cultivo de la piña.** [Additional data on pineapple culture.] Rev. Agric. [Mexico] 6: 645-649. 5 fig. 1922.—The author discusses the advantages and disadvantages of the different parts of the pineapple plant used for propagation, slips, crown slips, crowns, and suckers. Difficulties in pineapple cultivation experienced in Porto Rico, Hawaii, and Florida are reviewed.—John A. Stevenson.

463. LESLIE, W. R. **The Russian apple in America.** Proc. Amer. Soc. Hort. Sci. 18: 257-263. 1921 [1922].—This paper presents a history of the Russian apple in America, including introduction, present status, and influence on American horticulture.—W. E. Whitehouse.

464. LONGO, BIAGIO. **Su la vite selvatica della Maremma.** [On the wild vine of Maremma.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. 30: 393-394. 1921.—Observations were made on the remarkable growth in Tuscan Maremma of the wild grape vine (*Vitis vinifera silvestris*). The possibilities of using this vine in agriculture, due to its apparent resistance to *Oidium*, *Peronospora*, and *Phyloxera*, are considered.—F. M. Blodgett.

465. LYNCH, W. D., C. C. McDONNELL, J. K. HAYWOOD, A. L. QUAINANCE, and M. B. WAITE. **Poisonous metals on sprayed fruits and vegetables.** U. S. Dept. Agric. Bull. 1027. 66 p. 1922.—When fruits and vegetables are sprayed in accordance with the schedules recommended by the Bureau of Entomology and Plant Industry but little of the material used

466. McHATTON, T. H., and N. D. PEACOCK. **Apple culture in Georgia.** Georgia State Coll. Agric. Bull. 239. 44 p., 22 fig. 1921.—The paper begins with a history of the apple in Georgia, and later gives a discussion of the best sites, locations, varieties, etc., for this fruit. It also contains a spray calendar and a discussion of common insects and diseases which attack the apple, ending with varietal adaptations and descriptions.—*T. H. McHatton.*

467. MACNAUGHTON, MALCOM. **The grape vine.** Gard. Chron. 71: 215, 233, 246, 262. 1922.—This is a lecture delivered to the Dundee Horticultural Association. Grapes are generally believed to have been introduced into England by the Romans, A. D. 10, and then trained to the tops of the highest trees; but little progress was made until they were grown under glass. The heating system, training, propagation, and care are described in detail.—*P. L. Ricker.*

468. MACOUN, W. T. **Observations on hardiness in the colder parts of Canada.** Proc. Amer. Soc. Hort. Sci. 18: 160-165. 1921 [1922].—This paper presents a brief history of the studies on hardiness in Canada, together with observations on the hardiness of stocks which are of great economic importance in Canada.—*W. E. Whitehouse.*

469. MEIER, F. C. **Wastage of fresh fruits and vegetables in transit and in storage.** Rept. Maryland Agric. Soc. 5: 310-318. 1920 [1921].—The several causes and remedial measures, with limited statistics on a few crops are given.—*A. Lee Schrader.*

470. MONTEALEGRE, MARIANO R. **La poda del cafeta.** [Pruning of coffee trees.] Bol. Camara Agric. Costa Rica 1: 113-128, 144-149. 1921.—A general discussion is presented of pruning in all its phases as related to coffee culture in Costa Rica.—*John A. Stevenson.*

471. OSKAMP, J. **The value of a more careful selection of plots and longer periods of observation in connection with pomological demonstrations.** Proc. Amer. Soc. Hort. Sci. 18: 113-114. 1921 [1922].

472. OVERHOLSER, E. L. **Cold storage as an aid to the marketing of plums.** California Agric. Exp. Sta. Bull. 344. 427-463. 1922.—The most desirable temperature for storage appears to be 32°F., there are, however, certain varieties of plums which keep well at 36°F. and which when properly picked and handled can be expected to hold up sufficiently well to be shipped by refrigerator boats through the Panama Canal to eastern coast markets. These varieties are: Kelsey, Wickson, Agen (French), Grand Duke, Satsuma, Yellow Egg, Pond, Climax, Tragedy, Robe de Sergeant, and Beauty; 4 other varieties (German, Imperial, Sultan, and Combination) may be suggested, although their keeping period at 36°F. is 7-10 days less. These last-named plums, however, will be marketable in eastern markets for only a relatively short period after removal from storage. Varieties of plums which appear to be unsuited for shipment east by boat, because of poor keeping qualities at 36° F., are Sugar, Columbia, Abundance, Botan, Burbank, Peach, Washington, and Clyman. The relative importance of the varieties of plums, as indicated by the amounts received upon the New York City markets during the season of 1920, is as follows: Kelsey, Pond (Gross, Hungarian), Wickson, Tragedy, Giant, Grand Duke, Diamond, Burbank, Climax, Beauty, American Blue, Clyman, Sugar, President, Gaviota, Santa Rosa, California Blue, Formosa, Purple Duane, German, Yellow Egg, and Apex. There is evidence that most of the shipping plums are frequently picked too green; 2-3 days longer upon the tree does not appreciably shorten their storage period and does result in larger size and better color and flavor.—*A. R. C. Haas.*

473. PARANJPE, H. P. **Cultivation of oranges and allied fruits in the Bombay Presidency (India).** Bombay Presidency Dept. Agric. Bull. 95. 23 p. 1919.—Horticultural practices in cultivating *Citrus* in western India are given.—The varieties grown belong to *C. decumana*, *C. Medica*, and *C. aurantium*. Of the last species there are commonly grown 3 loose-skinned and 1 tight-skinned varieties.—The particular climatic, soil, and cultural demands of the several varieties are given. Budding or otherwise propagating varieties on other than their own

stocks is desirable. Details of stocks and methods of propagation are described.—Root pruning, cultivation, withholding of irrigation water, manuring, and exposure of roots are some of the methods employed to control fruiting in order to produce a crop at the desired season. Suggestions are given as to possible reasons for failure. Diseases are numerous.—Analyses of orange garden soils and unsuitable irrigation water are appended.—*Robert L. Pendleton.*

474. PATVARDHAN, G. B. Fruit culture in Palitana and Jamnagar (Kathiawar, India). Bombay Presidency Dept. Agric. Bull. 101. 28 p., 3 pl. 1920.—In small plantings in Palitana Sweetwater, Muscatel, Black Hamburg, and Sultana vines are trained on wires or wooden supports. Detailed descriptions are given of the pruning system. The manuring practise is complicated, involving the annual removal of the soil from about the roots and replacing it with fresh soil mixed with lime, bone meal, and cotton seed cake. Wood ashes are used to ward off termite attacks. Irrigation, pruning, and spraying methods are fully described.—The citrus plantings are of Australian navels, Agra and Delhi oranges, sweet and sour limes, and Sicilian lemons. The cultural methods include green manuring with san (*Crotolaria juncea*), frequent irrigations, annual renewal of soil (mixed with fertilizers) about the roots, and careful pruning. Freshly slacked lime is spread under the trees to kill Mediterranean fruit flies, which are a very serious pest.—In a description of recent citrus plantings at Jamnagar, near the coast, good care is emphasized as essential. Effective windbreaks are necessary.—*Robert L. Pendleton.*

475. POPENOE, PAUL B. Costa Rica, land of the banana. Nation. Geog. Mag. 41: 201-220. 17 fig. 1922.—Notes are included on the growth and production of bananas and of coffee.—*W. M. Atwood.*

476. PRAYAG, S. H. A preliminary note on the increase of grape yield. Agric. Jour. India 17: 41-50. Pl. 4-5. 1922.—Experiments are described dealing with the most suitable method of training grapes in western India.—*A. Howard.*

477. PRETTYMAN, H. W., and H. S. VANDEVORT. West Virginia demonstration community packing house, second report. Proc. Amer. Soc. Hort. Sci. 18: 110-112. 1921 [1922].—This report of the second year's operation of a community packing house shows progress made, and the effect on development of packing houses in other communities. The packing house was in a position to determine for growers, by actual grading of a few small lots, whether their apples should be graded and barrelled or sent direct to the cannery.—*W. E. Whitehouse.*

478. PRIEGO, J. MANUEL. Las variedades del olivo. [Olive varieties.] Bol. Agric. Tech. Econ. [Spain] 14: 141-148. 1922.—The olive occurs widespread in Europe and Asia, growing under varying conditions, which has resulted in the origination of many varieties. The early Greeks and Egyptians recognized a number of varieties. Modern workers in France, Italy, and other countries have described a large number of distinct types. Some of the more important of these are briefly described.—*John A. Stevenson.*

479. RAWES, A. N., and S. FOX WILSON. Pollination in orchards (VI). Jour. Roy. Hort. Soc. 47: 15-17. 1922.—This paper deals with pollen-carrying agents. It was found that unlike hive bees wind is not an active agent in the distribution of fruit tree pollen. Several species of bumble bees were found to be active. House flies, midges, and small flies were also numerous.—*J. K. Shaw.*

480. REYNOLDS, PHILIP K. Historia del platano. [History of the banana.] Bol. Camara Agric. Costa Rica 1: 225-253. 1921.—An account is given of the banana industry as developed in Central America.—*John A. Stevenson.*

481. RIGOTARD, LAURENT. La culture du noyer en France. [The culture of walnuts in France.] Ann. Sci. Agron. Française et Etrangère 38: 1-9. 1921.—The following phases pertaining to the walnut are discussed: importance of export trade; decrease in production

in recent years; necessity of perfecting cultural practices; struggle against animal and vegetable parasites; scientific researches, theories, and practices; the rôle of a station in the study of the walnut.—A. B. Beaumont.

482. RUDOLF, W. Experiments with common rock salt: (I) Effect on asparagus. (II) Eradication of weeds and cleaning of roadsides with salt. (III) After effects of salt. *Soil Sci.* 12: 449-474. 1921.—Experiments with a top dressing of salt in addition to manure were made on 2- and 11-year asparagus plants. Common rock salt at the rate of 150, 300, and 500 pounds per acre was used. For the 2-year plants the salt increased the average total length of plants 21.1-38.7 per cent, the number of stems 2.9-26.8 per cent, and the average weight of stalks per plant the following year 5.3-17.1 per cent. Similar results were secured with the older plants. Experiments with salt for killing weeds and brush along roadsides showed that 8 tons per acre will kill all vegetation except asparagus. As a rule 5-6 tons are effective while 3-5 tons are not sufficient to kill deep-rooted plants. Salting should be done about mid-season just before a rain, and high, rank vegetation should be cut immediately before or after applications. The injurious action of 4-5 tons per acre are still evident the 2nd year while the effects of 3-3.5 tons are imperceptible. With 2-2.5 tons a fertilizing action seems to occur.—W. J. Robbins.

483. SET, G. B. Some practical hints on the management of orchards in India. *Agric. Jour. India* 16: 524-528. 1921.

484. SHAMEL, A. P., L. B. SCOTT, and C. S. POMEROY. Frost protection in lemon orchards. U. S. Depart. Agric. Bull. 821. 30 p., fig. 1-15. 1920.—Plots were selected containing 5-10 trees. A large percentage of fruit was saved in the winter of 1913 with adequate orchard heaters. Non-heated trees, injured by the freeze of 1913 and receiving good care, returned to normal production by January, 1914. The heating during the cold period of January, 1913, had practically no effect on the 2nd season's crop. The main effect of protecting trees during one season of low temperatures is in the saving of the crop for the current year. Lisbon trees bore a greater number of sound merchantable lemons after the freeze than Eureka, due to differences in habit of growth.—C. G. Vinson.

485. SHAMEL, A. D., L. B. SCOTT, C. S. POMEROY, and C. L. DYER. Citrus fruit improvement, a study of bud variation in the Eureka lemon. U. S. Dept. Agric. Bull. 813. 88 p., fig. 1-22. 1920.—Descriptions and performance records of 8 strains of the Eureka lemon are given.—C. G. Vinson.

486. SHAMEL, A. D., L. B. SCOTT, C. S. POMEROY, and L. S. DYER. Citrus-fruit improvement, a study of bud variation in the Lisbon lemon. U. S. Dept. Agric. Bull. 815. 70 p., fig. 1-14. 1920.—Performance records presented in this bulletin show that the Lisbon strain and the Open strain are the only ones of commercial importance. These strains of the Lisbon lemon are isolated through bud selection.—C. G. Vinson.

487. THOMAS, EDWARD E. Studies on the irrigation of citrus groves. *California Agric. Exp. Sta. Bull.* 341. 353-370. 1922.—Four points have been investigated in this work: (1) the amount of water in the soil at the upper and lower ends of long furrows; (2) the appearance and productiveness of trees growing at the upper and lower ends of long furrows; (3) the amount of available moisture in the soil when the water is applied at intervals of 30, 45, and 60 days; and (4) the effect of deep and shallow cultivation on the water-absorbing power of the soil.—(1) The results of this investigation indicate that irrigation furrows exceeding 250-300 feet in length are undesirable. When longer furrows are used the soil near the upper end inevitably receives an excess of water, becoming "water-logged." A portion of the soluble plant food will be leached and carried below the root zone by the water.—(2) Citrus trees growing on heavy soil may become stunted when excessively irrigated; the leaves turn more or less yellow and many of them fall prematurely. The yield of fruit is also greatly impaired and

in some instances the trees may become unprofitable. In many groves it would be advisable to install a greater number of distributing pipe lines in order to shorten the irrigation runs.—(3) In order to secure best results irrigation water should be applied at the time it is needed, as gauged by the moisture content of the soil; whenever this procedure is impracticable it should be applied at intervals best suited to the soil type, as determined by experience or definite experiments.—On heavy loam soils such as that under consideration, the soil moisture remained more uniform and the conditions for root development better, with a 60-day interval between irrigations, than with a 30-day interval.—(4) The water-absorbing power of heavy soil is influenced by the method of tillage. The soil should not be stirred while it is wet. Frequent shallow cultivation tends to pack the soil immediately below the cultivated area. The plow-sole thus formed retards the movement of water in the soil.—Good conditions for plant growth can be obtained by harrowing the soil lightly after it has become sufficiently dry near the surface to prevent puddling, then allowing it to remain undisturbed until it has dried out more deeply to permit deep and thorough cultivation.—*A. R. C. Haas.*

488. TROWBRIDGE, P. F. Report of the director, year ending June 30, 1921. North Dakota Agric. Exp. Sta. Bull. 159. 28-32, 2 fig. 1922.—Miscellaneous notes are given on varieties of vegetables, including onions, mangels, and potatoes; upon fruits, forest trees, and ornamentals.—*L. R. Waldron.*

489. WILLIAMS, R. O. Budding the avocado. Bull. Dept. Agric. Trinidad and Tobago 18: 125-128. 1919.—The writer brings forth additional evidence against the idea that the avocado is difficult to bud successfully. The method of budding, including the selection of buds and stocks, and the season for budding are given.—*Florence A. McCormick.*

490. WIMSHURST, C. R. Apple growing in Australasia and America: a comparison with English conditions. Jour. Ministry Agric. Great Britain 28: 1005-1010. 1922.

491. YOUNG, W. J. Preliminary report on the use of sodium silicate as a wound dressing. Proc. Amer. Soc. Hort. Sci. 18: 196-197. 1921 [1922].—The Muscadine grape if pruned after Jan. 1 bleeds excessively, and under certain conditions may bleed to death. The author found that wounds treated with sodium silicate solution remain dry and do not bleed.—*W. E. Whitehouse.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

492. ANONYMOUS. Dahlias at Wisley 1921. Jour. Roy. Hort. Soc. 47: 56-73. 1922.—This report of trials of 240 stocks gives the awards of a joint committee of the Royal Horticultural Society Floral Committee and the National Dahlia Society. The varieties are classified, and brief descriptive notes are given.—*J. K. Shaw.*

493. ANONYMOUS. Mid season peas at Wisley 1921. Jour. Roy. Hort. Soc. 47: 81-89. 1922.—Awards, descriptions, and notes of 153 pea stocks are given, and the varieties classified.—*J. K. Shaw.*

494. ANONYMOUS. Sweet peas at Wisley 1921. Jour. Roy. Hort. Soc. 47: 74-80. 1922.—Sweet peas (113 stocks) were judged under ordinary garden cultivation instead of as produced for exhibition. Awards, descriptions, and notes are given in a classified list of varieties.—*J. K. Shaw.*

495. BOECK, AUGUST. Eine Sortenauslese empfehlenswerter Phlox decussata-Züchtungen. [A select list of improved varieties of *Phlox decussata*.] Möllers Deutsch. Gärt. Zeitg. 37: 202-203. 1922.—The writer describes 33 varieties or hybrids of *Phlox decussata*, and arranged them according to color.—*J. C. Th. Uphof.*

496. BROTHERSTON, R. P. **The pentstemon.** Gard. Chron. 70: 208. 1921.—This flower is of comparatively modern cultivation, some of the more common species having been introduced into England about 1825. Notes on some of the species are given with dates of introduction.—P. L. Ricker.

497. BROTHERSTON, R. P. **The sweet williams.** Gard. Chron. 70: 136. 1921.—The sweet william, first mentioned by Turner in 1573, was in general cultivation in English gardens by 1629, but little progress was made in improving it until the 18th century. Some early hybrids are mentioned and brief cultural notes given.—P. L. Ricker.

498. DOHRN, P. H. **Deutsche Edelcanina.** [German improved Canina stock.] Möllers Deutsch. Gärt. Zeitg. 37: 175-176. 3 fig. 1922.—Deegens, Senffs, and Kokulinsky types of *Rosa canina* are described as stocks for rose varieties and hybrids.—J. C. Th. Uphof.

499. DYKES, W. R. **Crocus species.** Gard. Chron. 71: 126. 1922.—Some early species and varieties for cultivation are noted.—P. L. Ricker.

500. DYKES, W. R. **The classification of garden irises.** Jour. Roy. Hort. Soc. 47: 2-7. 1922.—This classification deals only with the bearded irises grown in gardens and is based on trials of varieties begun at Wisley in 1915. It was found impossible to base the classification on wild species, therefore color, height, and season are the characters used. An outline of color classification with typical examples is given. A complete list will follow.—J. K. Shaw.

501. EHRENTHAUT, E. **Camellien-Kultur.** [Camellia culture.] Möllers Deutsch. Gärt. Zeitg. 37: 159-160. 1922.—Camellia varieties are propagated by cuttings or by grafting on *C. Chandleri elegans* and *Campbell*. The latter species especially is used for varieties which are difficult to grow from cuttings or which do not produce well-developed buds. Cuttings taken in July or November-December must have 3-5 leaves. They are put in propagating beds containing sandy heather soil at a temperature of 20-22°C. At irregular soil temperatures the cuttings produce large callous but no roots. When rooted they are put into small pots containing heather and lawn soil. The 3rd year they are planted in larger pots. During winter they are kept close under the glass in a light greenhouse which is free from frost.—J. C. Th. Uphof.

502. ELWES, H. J. **The Darrah collection of cacti at Manchester.** Gard. Chron. 70: 198-199. 1921.—A very large collection of succulent cacti, assembled by the late Charles Darrah, was presented by his widow to the corporation of Manchester in 1903. A range of houses, built in Alexandra Park to contain the collections, was opened to the public in December, 1906. A catalog of the original bequest lists 1,350 species and contains many interesting notes.—P. L. Ricker.

503. GROVE, A. **Lilies in 1921.** Gard. Chron. 71: 228-229. 1922.—This is a general consideration of meteorological conditions in relation to disease and various species in cultivation.—P. L. Ricker.

504. HALL, DANIEL. **The florists' tulip.** Gard. Chron. 71: 128, 140. 1922.—This is a lecture delivered at a recent meeting of the London School Gardening Association.—P. L. Ricker.

505. HASTINGS, G. T. [Rev. of: TRELEASE, WILLIAM. **Plant materials of decorative gardening. The woody plants.** xliii + 177 p. Urbana, Illinois, 1921. \$1.00] *Torreya* 22: 88. 1922.—This 2nd edition presents 4 keys to the trees, shrubs, undershrubs, and woody climbers found commonly in cultivation in the eastern U. S. A.; 7 genera are described, and 1,150 species mentioned. A glossary is attached.—J. C. Nelson.

506. HEAL, JOHN. Blue flowering climbers for the greenhouse. Gard. Chron. 71: 305-306. 1922.—Notes on plants for runner use, temperature requirements, and best method of handling are given.—P. L. Ricker.

507. HEAL, JOHN. *Dracaena*. Gard. Chron. 71: 154. Pl. 78. 1922.—Notes on introduction, best species and varieties, and methods of cultivation are given.—P. L. Ricker.

508. HENRY, A. *Populus generosa*. Gard. Chron. 70: 232. 1921.—Two trees at Kew 7 years old from seed are 36½ feet high with a girth of 21½ inches breast high. This vigorous hybrid was first introduced at Kew in March 1912 from a cross made by dusting pollen of the west American balsam poplar (*P. trichocarpa*) on pistillate flowers of a black poplar (*P. angulata*). It is well worth cultivating both as an ornamental and possibly as a timber tree; it demands freedom from shade and has an extensive root system.—P. L. Ricker.

509. HURST, C. C., and MABEL S. G. BREEZE. Notes on the origin of the moss-rose. Jour. Roy. Hort. Soc. 47: 26-42. 1922.—The moss rose, *Rosa muscosa*, of Miller differs from the cabbage rose, *R. centifolia*, in its multiplicity of glandular organs. Reviews of the histories of the old cabbage rose and of the moss rose are given. The former has been freely cultivated in Europe for more than 2000 years. The moss rose is traced back to about 1696 to the south of France and is considered to have arisen from the cabbage rose by bud mutation on 3 different occasions. The White Provence or Rose Unique and Rose de Meaux have also given origin to moss forms by bud mutations. It is not known whether the "moss" character is due to a single Mendelian factor but the evidence is in favor of its being a simple dominant. A list of 104 papers is appended.—J. K. Shaw.

510. KACHE, PAUL. *Primula malacoides* und ihre Hochzucht für den Winterflor. [Primula malacoides and its breeding for winter-flowering.] Möllers Deutsch. Gärt. Zeitg. 37: 197-199. 1 fig. 1922.—Berlin, a type of this species observed in the trial grounds of the Horticultural College in Dahlem, had larger and more beautifully shaped flowers which were self fertilized, the offspring closely resembling the parent.—J. C. Th. Uphof.

511. KREBS, JOS. Kultur und Anzucht der Gloxinien. [Growing Gloxinias.] Gartenwelt 26: 339. 1922.—Seed of Gloxinias is sown January-February in fine muck or sandy leaf soil with a temperature of 25°C. The sown seed is not covered with soil. Seedlings transplanted 2-3 times and kept at 25-30°C. are large enough to be transplanted into 12-cm. pots and will flower late in July. The soil should be composed of leaf mould, muck sand, rotted manure, and some horn meal. In very hot weather plants should be sprayed with water and shaded. For each tuber only 2-3 of the best shoots are retained.—J. C. Th. Uphof.

512. MAGOR, E. J. P. Rhododendrons. Gard. Chron. 71: 42-43. 1922.—It is stated that lime and not peat is necessary for the growth of Rhododendrons and that the latter is often fatal to them. The best varieties for cultivation are discussed.—P. L. Ricker.

513. MULFORD, F. L. Street trees. U. S. Dept. Agric. Bull. 816. 58 p., fig. 1-37. 1920.—An outline map of U. S. A. shows the regions within which essentially similar conditions for tree growth exist. Descriptions of trees and palms suitable for planting in the various districts are given.—C. G. Vinson.

514. PATEMAN, T. Winter flowering carnations. Gard. Chron. 71: 141. Fig. 69. 1922.—Notes are given on some of the best varieties arranged according to color.—P. L. Ricker.

515. PRIEGO, J. MANUEL. La variedad en arboricultura. [The variety in arboriculture.] Bol. Agric. Tech. Econ. [Spain] 14: 39-45. 1922.—The author discusses the origin of varieties, their importance in arboriculture, the fixing of new varieties, and the characters used to distinguish them.—John A. Stevenson.

516. PROSCHOWSKY, A. ROBERTSON. *Palms of the Riviera*. Gard. Chron. 70: 184-185. 1921.—A note is presented on the species of *Cocos* now referred to the genus *Blutia*.—P. L. Ricker.

517. PROSCHOWSKY, A. ROBERTSON. *Palms of the Riviera*. Gard. Chron. 71: 153. Pl. 77. 1922.—Notes on *Arecastrum romanzoffianum* are given.—P. L. Ricker.

518. SMITH, THOMAS. *Raising alpine plants from seed*. Gard. Chron. 71: 156. 1922.—A list of 36 genera taken from an English seed catalogue is given, with detailed methods of propagation.—P. L. Ricker.

519. THATCHER, A. E. *Chinese climbers at Aldenham*. Gard. Chron. 71: 270, 305. Pl. 144, 167. 1922.—Notes are given on *Actinidia*, *Celastrus*, *Clematis*, *Holboellia*, *Coculus*, *Drayea*, *Lonicera*, *Rubus*, *Sargentodoxa*, *Schizandra*, *Sinofranchetia*, and *Vitis*.—P. L. Ricker.

520. THATCHER, A. E. *Chinese shrubs at Aldenham*. Gard. Chron. 71: 114-115, 123, 137, 179, 199. Fig. 56, 67, 92, 102, 111. 1922.—Notes are presented on plants principally introduced to English gardening as a result of the 3rd Chinese expedition of E. H. Wilson.—P. L. Ricker.

VEGETABLE CULTURE

521. ANONYMOUS. *Experiments in the cultivation of tomatoes*. Exp. and Research Sta. Nursery and Market Garden Industries Development Soc. Ltd., Turner's Hill, Cheshunt Herts, Ann. Rept. 7: 8-13. 1921.—Mulches, base manures, and top dressings are discussed, with figures to show the effects of each on yield of tomatoes (*Lycopersicum esculentum* Mill.). Proper aeration also increased the yields.—W. H. Tisdale.

522. ANONYMOUS. *The manurial experiments*. Exp. and Research Sta. Nursery and Market Garden Industries Development Soc. Ltd., Turner's Hill, Cheshunt, Herts, Ann. Rept. 7: 8-13. 1921.—For Tomatoes (*Lycopersicum esculentum*) various combinations of artificials with and without dung and with and without some of the principle constituents are reported. The best yields were obtained with complete artificials minus nitrogen and minus dung. With Cucumbers (*Cucumis sativus*) the best results were obtained with complete artificials minus nitrogen. Artificials without nitrogen and dung also gave good results.—W. H. Tisdale.

523. AYRES, W. E. *Vegetables and truck for home use*. Mississippi Agric. Exp. Sta. Bull. 210. 16 p., 9 fig. 1921.—Variety tests under Mississippi Delta conditions are reported for turnips, tomatoes, Irish potatoes, sweet potatoes, beets, bush beans, sweet corn, cucumbers, squash, watermelons, and cantaloupes. Results with different methods of training tomatoes and suggestions for growing spinach, collards, lettuce, cabbage, okra, pepper, radishes, lima beans, garden peas, onions, strawberries, and blackberries are also given.—J. Fred O'Kelly.

524. BOSE, S. R. *Possibility of mushroom industry by cultivation*. Agric. Jour. India 16: 643-647. 1921.

525. BROWN, H. D. *Canning-factory tomatoes*. Indiana (Purdue) Agric. Exp. Sta. Bull. 259. 20 p., 7 fig. and frontispiece. 1922.—Indiana is one of the 4 leading states in canning-tomato production. The yield of wheat following tomatoes is greater than the yield following wheat, corn, or even clover. Methods of growing the plants and transplanting are described. Yield data for different fertilizers are given; 500-1,000 pounds per acre of a 2-12-6 fertilizer is recommended. Acid phosphate increases the earliness of the crop.—Max W. Gardner.

526. DOMINGUEZ, IGNACIO. *La alcachofa*. [The globe artichoke.] Rev. Agric. [Mexico] 7: 73-76. 4 fig. 1922.—The author discusses the culture, harvesting, and uses of the globe artichoke under Mexican conditions.—*John A. Stevenson*.

527. ESCOBAR, ROMULO. *El esparrago*. [Asparagus.] Rev. Agric. [Mexico] 7: 15-19. 3 fig. 1922.—Popular.—*John A. Stevenson*.

528. FIROR, GEORGE H., and LOIS P. DOWDLE. *Pimento growing*. Georgia State Coll. Agric. Bull. 234. 16 p., 5 fig. 1921.—Pimento, a variety of pepper (*Capsicum annuum* L.), is popular because of its mild flavor, thick meat, and smooth skin. Seed should be started in hot beds and plants set into a friable, fertile loam in rows 3 feet apart and 14-18 inches in the row. The latter part of the bulletin contains instructions for canning and cooking pimentos.—*T. H. McHatton*.

529. GAY, M. C. *Harvesting, storing and marketing sweet potatoes*. Georgia State Coll. Agric. Bull. 244. 12 p., 1 fig. 1921.—A general discussion is given of the proper methods of harvesting and handling commercially the sweet potato (*Ipomoea batatas* L.).—*T. H. McHatton*.

530. MÜLLERS, L. *Gemüsesamenbau*. [Vegetable seed growing.] Gartenwelt 26: 300-302. 12 fig. 1922.—Suggestions for growing seed of white and red cabbage and cauliflower are given.—*J. C. Th. Uphof*.

531. OROZCO, ENRIQUE. *El cultivo de hongos en la Sierra de Puebla*. [Mushroom cultivation in the Sierra Puebla.] Rev. Agric. [Mexico] 6: 326-331. 7 fig. 1921.—A popular article on mushroom growing, in which *Clavaria tlahuicole* is mentioned, but not described, as a new species.—*John A. Stevenson*.

532. SANDO, CHARLES E. *The process of ripening in the tomato, considered especially from the commercial standpoint*. U. S. Dept. Agric. Bull. 859. 38 p., pl. 1-4. 1920.—This publication gives analyses of tomatoes of several degrees of maturity and of tomatoes ripened artificially under various conditions of vegetation. Throughout the ripening period there was found an increase in moisture, acids, and sugars, and a decrease in solids, total nitrogen, starch, pentosans, crude fiber, and ash. Lack of ventilation during ripening increased the acid content approximately 138 per cent. The flavor of tomatoes ripened without ventilation was very inferior.—*C. G. Vinson*.

533. STUCKEY, H. P. *Further studies in fertilizing and storing sweet potatoes*. Georgia State Exp. Sta. Bull. 134. 11 p. 1919.—This bulletin reports work from 1914 to 1919, following the report of work from 1908 to 1913 in bulletin 107. Six plots were used in the fertilizer work (1) 24 tons of stable manure annually; (2) 2,100 pounds of 16 per cent acid phosphate; (3) 900 pounds of sulphate of potash; (4) 1,500 pounds of sodium nitrate; (5) 1,800 pounds of a complete fertilizer; (6) check. The soil was a Cecil clay loam. After 12 years the complete fertilizer plot led all others, with the stable manure plot next; but the yields obtained in excess of those of the check did not pay for the fertilizer. The nitrogeous plots yielded roots (*Ipomoea batatas*) of a lighter color and poorer flavor; the best quality products were obtained from the check and acid phosphate plots. The check plot produced the best keeping roots, and those from the grey land kept better than those from the red. In storage it was ascertained that potatoes lose an average of 16.6 per cent in weight from November to March; 3.73 per cent is the loss in water and the remainder is presumed to be due to the breaking down of carbohydrates and formation of CO₂.—*T. H. McHatton*.

534. WAGNER, F. *Der Hopfenbrau in Bayern*. [Hop culture in Bavaria.] Illustr. Landw. Zeitg. 42: 197-198. 1922.—A history and brief description of the hop industry of Bavaria is sketched.—*John W. Roberts*.

HORTICULTURAL PRODUCTS

535. GREGER, JUSTIN. Über Traubenholunder-Marmelade. [Elderberry marmalade.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 383-384. 1921.—Products of *Sambucus nigra* and *S. racemosa* are compared.—E. E. Stanford.

536. KRUG, O., und G. F. FIESELDMANN. Die 1921-er Weinernte in der Pfalz. [Vintage of 1921 in the Palatinate.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 384-389. 1921.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 183, 197, 215, 227, 228, 246, 439, 542, 647, 673, 680, 761, 777, 828, 902, 914, 925)

537. DENHAM, HUMPHREY JOHN. The structure of the cotton hair and its botanical aspects. Jour. Textile Inst. 13: 99-112. 1 pl. 1922.—The structure of the cotton hair is described in detail as to general conformation; primary wall; secondary wall; central canal and contents; pits, spiral markings and convolutions, and various abnormalities. The hair is a typical plant hair except that unlike other epidermal cells it has pits in its wall. Various explanations are suggested for the spiral markings and striations, these evidently having some connection with the spiral path of the nucleus and cytoplasm. The function of the cotton hair is unknown but the author suggests that it may afford an outlet for the elimination of excess polysaccharide material at a time when the needs of the plant are chiefly protein for the developing seeds.—E. W. Sinnott.

538. VUILLEMIN, PAUL. L'inflorescence. [The inflorescence.] Bull. Soc. Sci. Nancy IV, 1: 57-67. 1921.—Popular explanation of forms of inflorescence in phanerogams, with tabular recapitulation, is presented.—A. Chase.

539. WERTH, E. Zur experimentellen Erzeugung eingeschlechtiger Maispflanzen und zur Frage: Wo entwickeln sich gemischte (androgyn) Blütenstände am Mais? [On the experimental production of unisexual maize plants and the question: Where are hermaphrodite inflorescences developed in maize?] Ber. Deutsch. Bot. Ges. 40: 69-77. Fig. 1-2. 1922.—Maize plants were grown in crowded conditions in 20-22 cm. pots. The resulting plants were divided into 11 groups based on the degree of development of pistillate and staminate inflorescences. The more starved showed an increased tendency to form pistillate inflorescences. The 1st of the 11 groups contained normal plants; the 11th, sterile stalks with deformed essential organs; and the other groups showed variations between these 2 extreme conditions. However, no plant with only pure staminate flowers was observed. The plants ranged from 2.5 to 75 cm. in height. Experimental mutilation failed to increase the number of suckers. The percentage of hermaphrodite inflorescences on both the main stalk and the suckers was changed by selection but much more in the case of the suckers. There seemed to be a relation between size of the sucker and kind of inflorescence. The suckers with terminal staminate inflorescence were almost as fully developed as the primary stalk. The presence of hermaphrodite terminal flowers reduced the length growth, as did the presence of pistillate terminal inflorescences. These findings do not accord with previous reports of Goebel in the fir. The terminal part of a plant receives more nourishment than the lower portion, hence in maize the terminal inflorescence is normally staminate and the less well nourished lateral inflorescence develops as pistillate.—J. L. Collins.

540. ZIMMERMANN, A. Zur physiologischen Anatomie der Cucurbitaceen. [On the physiological anatomy of the Cucurbitaceae.] Ber. Deutsch. Bot. Ges. 40: 2-8. 1922.—This paper is based on a comparative study of the anatomy of a large number of representatives

of the family occurring in German East Africa (Amani). It includes a large number of observations relative to stomata; trichomes; number, location, course, and character of vascular bundles; occurrence of sieve tubes outside the bundles; abnormalities in the secondary thickening of the stem; differences in sun and shade leaves; presence of cystoliths, and power of the cells of the ground tissue of the stem to accumulate methylene blue and eosin from solutions of these pigments.—*Richard Holman.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 243, 266, 776, 810, 833, 835)

541. BORGE, O. Die Algenflora des Tåkernsees. [The algal flora of the Tåkern Lake.] Sjön Tåkerns Fauna och Flora Vol. 4. K. Svenska Vetenskapsakademien. 48 p. 40 fig. 1921.—A systematic account together with descriptions and notes on the occurrence of some 300 species and varieties of algae is given. About a third belong to the Desmidiaceae. The following are described as new: *Anabaena subcylindrica*, *Cosmarium Printzii*, *C. subturpinii*, *C. praecisum*, *C. geometricum* West var. *suecicum*, *Staurostrum tetracerum* (Kütz.) Ralfs. var. *tortum* (Teiling) n. comb., *S. papillosum* Kirchn. var. *contiguum*.—*L. H. Tiffany.*

542. CHEMIN, E. Sur le parasitisme de *Sphacelaria bipinnata* Sauvageau. [On parasitism of *Sphacelaria bipinnata*.] Compt. Rend. Acad. Sci. Paris 174: 244-247. Figs. 1-2. 1922.—It is found that *S. bipinnata* cannot be considered a true parasite, as it requires only support and receives no nourishment from its host. The tissues of *Halidrys siliquosa* is figured and described, both before and after the attached plants of *Sphacelaria* have been removed. Complete regeneration of tissue has in the meantime been accomplished.—*C. H. Farr.*

543. CHURCH, A. H. The somatic organization of the Phaeophyceae; an introduction to the theory of the plant-soma. Bot. Mem. [Oxford] 10. 110 p. 1920.—The Phaeophyceae, though relatively few in number of genera (130) and species (1,000), as at present recorded, show a range of somatic and reproductive specialization beyond that of any other empirical plant series, and are of outstanding interest in that they illustrate the evolution of massive parenchymatous growth-forms as the inevitable response of autotrophic life to the physical factors of the sea. The working hypothesis put forward is that the soma of land-vegetation has not been evolved independently, in response to the conditions of sub-aerial environment, but that its fundamental features have been inherited and adapted from a former submerged phase; and that the evolutionary progress of the plant body can be traced in the evolution of the plant soma within this dominant group of marine vegetation. An attempt is thus made to account phyletically for the morphological distinctions in the land plant. The Benthic Phase of plant-life falls into 3 main epochs: (1) The rise of the filamentous soma in deeper water from the first sessile encysted autotrophic flagellate; (2) the rise of algal growth nearer the surface in shallow and well-illuminated water, with shock of wave-action, culminating in massive growth forms of submarine forest vegetation; (3) elaboration of reef-pool conditions as the first land-masses break above the surface. The plant soma of the land is but the seaweed soma adapted and enlarged for its new conditions; the general features of habit still traced in the forest tree were laid down, once for all, in the first benthic filament of the rising sea-bottom.—*Edith Philip Smith.*

544. DICK, J. Beiträge zur Kenntnis der Desmidiaceen-Flora von Südbayern. [Contributions to our knowledge of the desmid flora of South Bavaria.] Krypt. Forsch. Bayer. Bot. Ges. München 4: 230-262. Pl. 11-17. 1919.—The report here given is based on explorations made during the years 1912-1916. The region studied is situated south of Munich, and the

author gives a detailed account of the various localities visited. He lists the desmids, 254 in number, which he has detected and represents many of them on the accompanying plates. Under each species cell-measurements and full data regarding localities are given, and these are often supplemented by descriptive or critical remarks. Although no novelties are formally proposed under new names, a number of aberrant forms are mentioned and their distinctive features indicated.—A. W. Evans.

545. KAISER, PAUL E. Beiträge zur Kenntnis der Algenflora von Traunstein und dem Chiemgau. [Contributions to the algal flora of Traunstein and Chiem Lake district.] Krypt. Forsch. Bayer. Bot. Ges. München 3: 130-148. 20 fig. 1918.—The present paper represents the 4th of a series devoted to the algal flora of southeastern Bavaria, the earlier numbers having appeared prior to 1918. The species, varieties, and forms enumerated number 131 and are classified as follows: Cyanophyceae (14), Flagellatae and Dinoflagellatae (5), Zygothryxaceae (37), Conjugatae (60), and Chlorophyceae (16). The only new species proposed is *Spirulina vaginata*, but 3 new varieties or forms are described among the diatoms (Zygothryxaceae). In addition to these, 38 algae are reported for the first time from Bavaria. Full data regarding stations are given throughout, and many of the forms are accompanied by critical or descriptive notes. The majority of the figures illustrate desmids.—A. W. Evans.

546. KAISER, PAUL E. Desmidiaceen des Berchtesgadener Landes. [Desmids of the Berchtesgaden region.] Krypt. Forsch. Bayer. Bot. Ges. München 4: 216-230. 34 fig. 1919.—The present report on the desmids of southeastern Bavaria is based almost entirely on collections made by Von Schoenau. The species, varieties, and forms enumerated number 154 and represent 17 genera; of these *Cosmarium* includes 65 species (and varieties), *Staurastrum* 26, *Euastrum* 14, *Closterium* 13, and the others less than 10 each. Each species is accompanied by cell-measurements, data regarding stations, references to published figures, and (in many cases) descriptive or critical notes. No new species are described but 4 new varieties and forms are proposed. The figures illustrate specimens of unusual interest.—A. W. Evans.

547. MAYER, ANTON. Bacillariales der Umgegend von Ortenburg (Niederbayern). [Diatoms from the vicinity of Ortenburg (Lower Bavaria).] Krypt. Forsch. Bayer. Bot. Ges. München 3: 122-148. Pl. 3-4. 1918.—The author gives a report based on his own collections of April, 1917. The species detected number 102 and represent 27 genera. *Nitzschia palea* var. *romana* Grunow is raised to specific rank under the name *N. romana* (Grunow) A. Mayer, and 8 other species or varieties are recorded for the first time from Bavaria. Many of the species are accompanied by descriptive or critical remarks, and forms of unusual interest are figured.—A. W. Evans.

548. MAYER, ANTON. Bacillariales von Reichenhall und Umgebung. [Diatoms of Reichenhall and vicinity.] Krypt. Forsch. Bayer. Bot. Ges. München 4: 191-215. Pl. 5-10. 1919.—The present report is based on a series of collections made by Von Schoenau. The species listed number 201 and represent 36 genera. Many of the species are accompanied by descriptive or critical remarks, and most of the more interesting specimens are figured. In certain cases distinct varieties or forms are enumerated. Several varieties and the following species are proposed as new: *Achnanthes conspicua*, *Cocconeis thumensis*, *Fragilaria gracilima*, *Navicula dimidiata*, *N. graciloides*, *N. involuta*, *N. lacta*, *Neidium tenellum*, *Surirella thumensis*, and *Synedra delicatula*.—A. W. Evans.

549. MAYER, ANTON. Die bayerischen Eunotien. [The Bavarian species of Eunotia.] Krypt. Forsch. Bayer. Bot. Ges. München 3: 95-121. Pl. 1-2, 3 fig. 1918.—The diatom genus *Eunotia*, according to the present report, is represented in Bavaria by 23 species, under several of which distinct varieties or forms are recognized. For the whole of Germany only 27 species have been definitely recorded. After an account of the generic characters and a key for the determination of the species, the latter are fully and critically described, with citations of the literature and definite data regarding Bavarian stations. The various species, varieties, and forms are figured.—A. W. Evans.

550. MERRIMAN, MABEL L. A new species of *Spirogyra* with unusual arrangement of the chromatophores. Amer. Jour. Bot. 9: 283-284. 3 fig. 1922.—A new species, *S. rectispira*, is described from New York City. It is closely related to *S. crassa*, from which it differs in its smaller zygospores and in the parallel arrangement of the chromatophores in vegetative cells of conjugating threads.—E. W. Sinnott.

551. PRINTZ, HENRIK. Subaerial algae from South Africa. Det Kgl. Norske Videnskabs Selskabs Skrifter 1921: 1-41. 14 pl. 1921.—An examination of 403 samples of subaerial algae collected in the environs of Durban and of Saldanha Bay, Africa, revealed 22 species. The following are described as new: *Protococcus consociatus*, *P. verrucosus*, *Chlorococcum vitiosum*, *Phaseolaria obliqua* nov. gen. et sp., *Myrmecia globosa* nov. gen. et sp., *Acanthococcus granulatus* Reinsch var. *aerophilus*, *Pleurastrum constipatum*, *Physolinum monile* (De Wildem.) nov. gen. et comb., *Trentepohlia lagenifera* (Hildebrandt) Wille var. *africana*, *Atractella affixa* nov. gen. et sp., *Myxosarcina concinna* nov. gen. et sp. The last two are Myxophyceae, the others Chlorophyceae.—L. H. Tiffany.

552. PUYMALY, A. DE. Reproduction des *Vaucheria* par zoospores amiboides. [Reproduction of *Vaucheria* by amoeboid zoospores.] Compt. Rend. Acad. Sci. Paris 174: 824-827. 1922.—A description of the formation and dispersal of these spores is given for both *V. geminata* and *V. hamata*.—C. H. Farr.

553. SCHAFFNER, J. H. The classification of plants. XII. Ohio Jour. Sci. 22: 129-139. 1922.—This paper completes a series dealing with the classification of plants. Synopses of the several algal phyla and a key to the orders of Algae are given. A general table of the classification of the plant kingdom on a phyletic basis is also included.—H. D. Hooker, Jr.

554. SHAW, WALTER R. *Janetosphaera*, a new genus, and two new species of *Volvox*. Philippine Jour. Sci. 20: 477-508. Pl. 1-5, fig. 1-5. 1922.—Under the name *Janetosphaera aurea*, the species that has long been known as *Volvox aureus* is given the status of a monotypic genus mainly on account of the characters of the cell membranes that were brought out by Meyer and confirmed by Janet. The author points out, as others have done, that forms have been described under the name of this species that do not belong there. A transcript of an European description of the species is supplemented by data derived from Californian material. Two new species of *Volvox* are described from the Philippines: *V. Merrilli* and *V. Barberi*. The former resembles *V. globator* of Europe and *V. perglobator* of North America, and the latter resembles *V. Rousseleti* of Africa. Both asexual and sexual phases of the new species are described. Descriptions of the 5 species retained in *Volvox* are given to facilitate comparison. Distinguishing characters of these species are presented in a key and a table.—E. D. Merrill.

555. SHAW, WALTER R. *Merrillosphaera*, a new genus of the Volvocaceae. Philippine Jour. Sci. 21: 87-129. Pl. 1-8. 1922.—Under the name *Merrillosphaera Carteri* the species that has been known as *Volvox Carteri* is redescribed in accordance with the characters found in very abundant material, including all phases of the life history, found at Manila. It is made the type of a genus distinguishable from *Volvox* by the absence of protoplasmic connections between the cells, by differentiation of the asexual reproductive cells in early stages of the embryos, and by the great size attained by them before division. The species was originally described from Bombay. A North American form (*Volvox Weismannia*) is considered only a variety of *M. Carteri*. An African species (*V. africanus*) and an European species (*V. tertius*) are embraced in the new genus, the former having been found also at Manila. Some European material included by Klein in *Volvox aureus* is made tentatively the basis of the species *Merrillosphaera Migulae*.—E. D. Merrill.

556. STRÖM, KAARE MÜNSTER. Freshwater algae from Caucasus and Turkestan. Nyt Mag. Naturvidenskab. 57: 1-14. Pl. 2, fig. 1-16. 1919.—A systematic account is presented

of 71 species of algae identified from collections made in Caucasus and Turkestan. The following are described as new varieties: *Cosmarium granatum* Bréb. var. *depressum*, *C. subtumidum* Nordst. var. *minor*, *C. impressulum* Elfv. var. *punctatum*.—L. H. Tiffany.

557. STRØM, KAARE MÜNSTER. Some algae from hot springs in Spitzbergen. Bot. Notiser 1921: 17–21. 1921.—A list is given of algae collected in the hot springs, Trolldkilderne and Jotunkilderne, in the vicinity of Bock Bay, the temperature varying from 20–25°C.—L. H. Tiffany.

558. STRØM, KAARE MÜNSTER. The phytoplankton of some Norwegian lakes. Videnskapselskabet's Skrifter I Mat. Naturv. Kl. 4: 1–51. 3 pl., 23 fig. 1921.—A contribution to the freshwater plankton of Norway, including an account of the plankton of the lakes investigated and a systematic list of the species and their frequency in the lakes. Of the 174 species and varieties observed 111 are Chlorophyceae, 19 Myxophyceae, 26 Diatomeae, 8 Flagellatae, 8 Peridineae, 1 Phaeophyceae. Distribution percentage in the plankton is apportioned: 49 per cent Desmidiaceae, 11 per cent Myxophyceae, 17 per cent Diatomeae, other Algae 26 per cent.—L. H. Tiffany.

559. SUSSENGUTH, KARL. Beitrag zur Kenntnis der Algenflora Südbayerns. [A contribution to our knowledge of the algal flora of South Bavaria.] Krypt. Forsch. Bayer. Bot. Ges. München 5: 362–367. 1920.—The author gives a list of 124 algae from various parts of South Bavaria, each species being accompanied by data regarding localities and, in a few cases, by descriptive notes. The species are arranged according to the following groups: Schizophyceae (7), Protomastiginae (14), Chrysomonadinae (9), Cryptomonadinae (3), Eugleninae (18), Dinoflagellatae (6), Volvocales (6), Tetrasporales (5), Protoceceales (24), Ulotrichales (17), Microsporales (2), Zygnemales (9), and Heterochloridales (4). No new species are described.—A. W. Evans.

560. TAYLOR, WM. RANDOLPH. Notes on some algae from British Columbia. Rhodora 24: 101–111. 1 fig. 1922.—An annotated list is presented of the species collected in the Selkirk and Eagle Pass Mountains, with critical comments. *Rhizoclonium selkirkii* is a new species.—M. L. Fernald.

561. ZIMMERMAN, WALTER. Zur Entwicklungsgeschichte und Zytologie von Volvox. [The developmental history and cytology of Volvox.] Diss. Freiburg, 38 p. 1921.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 241, 250, 251, 256, 260, 263, 265, 266, 553)

562. ANONYMOUS. Hepatics. Moss Exchange Club Ann. Rept. [Arbroath] 26: 279–282. 1921.—Of the 53 species listed all came from the British Isles except 3,—1 from California, 1 from South America, and 1 from West Africa. Critical notes by D. A. JONES, H. H. K[NIGHT], W. E. N[ICHOLSON], and W. H. P[EARSON] elucidate some of the specimens distributed.—A. W. Evans.

563. ANONYMOUS. Hepatics. Moss Exchange Club Ann. Rept. [Arbroath] 27: 295–297. 1922.—The species listed number 51. The 8 exotic specimens came from South America and Tasmania, while the remaining specimens were all collected in the British Isles. Short critical notes by D. A. JONES, H. H. K[NIGHT], and W. H. P[EARSON] are included in the report.—A. W. Evans.

564. ANONYMOUS. Hepatics. Moss Exchange Club, Sec. II Rept. [Barmouth] 1920: 19–25. 1921.—Of the 93 species of hepatics distributed during 1920 and here listed, 12 came

from the Continent, 1 from Africa, and the others from the British Isles. D. A. J[ONES] and W. H. P[EARSON] have contributed a few critical notes.—A. W. Evans.

565. ANONYMOUS. Mosses. Moss Exchange Club, Sec. II Rept. [Barmouth] 1920: 6-18. 1921.—The report lists 145 species of mosses distributed during 1920. Most of the specimens came from the British Isles but 14 were collected on the Continent and 1 in Canada. Occasional critical notes by D. A. J[ONES], P. G. M. R[HODES], G. B. S[AVERY], W. R. S[HERRIN], and J. A. W[HILDON] are included.—A. W. Evans.

566. ANONYMOUS. *Sphagna*. Moss Exchange Club Ann. Rept. [Arbroath] 26: 271-273. 1921.—The specimens of *Sphagnum* distributed by the Club during 1920 are listed under 27 species. All the material was collected in the British Isles.—A. W. Evans.

567. ANONYMOUS. *Sphagna*. Moss Exchange Club Ann. Rept. [Arbroath] 27: 288-291. 1922.—The specimens of *Sphagnum* distributed by the Club are listed under 31 species, most of which are represented by several distinct varieties and forms. With the exception of 1 specimen from France and 3 from New Zealand the material was collected in the British Isles. A few critical notes are supplied by J. A. W[HILDON] and a new variety of *S. trichophyllum* Warnst., based on a New Zealand specimen, is provisionally proposed.—A. W. Evans.

568. ANONYMOUS. True mosses. Moss Exchange Club Ann. Rept. [Arbroath] 26: 273-279. 1921.—The species listed number 91. With the exception of 10 species from the Continent and 3 from New Zealand the list was based on material from the British Isles. Critical notes are supplied by H. N. D[IXON], W. E. N[ICHOLSON], P. G. M. R[HODES], W. G. T[RAVIS], and J. A. W[HILDON].—A. W. Evans.

569. ANONYMOUS. True mosses. Moss Exchange Club Ann. Rept. [Arbroath] 27: 291-294. 1922.—Of the 73 species listed 6 came from Switzerland, 4 from other parts of continental Europe, 1 each from California, New Zealand, and Tasmania, and the others from the British Isles. Critical notes accompanying certain specimens are by H. N. D[IXON], W. E. N[ICHOLSON], and P. G. M. R[HODES].—A. W. Evans.

570. AMANN, J. L'indice cellulaire des Fissidens européens du groupe "crassipes." [The cellular index of the European species of Fissidens belonging to the "crassipes" group.] Rev. Bryologique 48: 65-69. 1921.—The author applies his method of measuring leaf-cells by the "cellular index" [see Bot. Absts. 11, Entry 2659] to *Fissidens crassipes* Wils. and its European allies. In *F. crassipes* itself he finds much variation, the index ranging from 4,052 (cells per square mm.) to 16,876; and, on the basis of differences in cell measurements, he distinguishes the 3 groups *laziretis*, *medioretis*, and *densiretis*. In *F. Mildeanus* Schimp., a species very close to *F. crassipes*, the cellular index ranges (in round numbers) from 5,370 to 6,611; and in *F. rufulus* Br. Eur. from 10,700 to 14,950. The figures obtained for the other species in the group, *F. Monguilloni* Thér., *F. Arnoldi* Ruthe, and *F. rivularis* Spruce, are hardly numerous enough to have much significance.—A. W. Evans.

571. ANDREWS, A. LE ROY. *Hymenostomum* in North America. II. The case of *Astomum Sullivantii*. Bryologist 25: 66-71. 1922.—The author concludes that *Astomum crispum* (Hedw.) Hampe of Europe does not occur in North America, plants so referred being mostly *A. Sullivantii* B. & S. The earliest name of this latter plant is *Phascum Muhlenbergianum* Swartz, necessitating the new combination *Hymenostomum Muhlenbergianum* (Swartz) Andrews; the types both of Swartz's and of Bruch and Schimper's species have been studied. While the actual type specimen of *Astomum nitidulum* B. & S. was lost by Sullivant, a study of authentic material and of drawings leads to the conclusion that the material was hybrid in origin. The distinction between *A. crispum* and *A. Sullivantii* is largely quantitative though fairly constant, but the plants could be treated as marked geographic varieties. The author notes that the occurrence of *A. crispum* in China and Japan needs careful investigation, questions (in a foot-note) the validity of *A. multicapsulare* (Sm.) B. &

S., and states that *A. intermedium* Péterfi has not yet found a place in European bibliography.—E. B. Chamberlain.

572. ARMITAGE, E. Notes. Moss Exchange Club Ann. Rept. [Arbroath] 26: 282. 1921.—Several varieties of mosses are recorded for the first time from Herefordshire [England], and 2 old reports for the county are corrected.—A. W. Evans.

573. ARMITAGE, E. [Notes.] Moss Exchange Club Ann. Rept. [Arbroath] 27: 297, 298. 1922.—Certain published records for the hepatics of the English counties of Worcester, Stafford, and Warwick and for the mosses of the county of Hereford are corrected, having been based on incorrect determinations, and the following new records are given: *Lophocolea alata* for Worcestershire; *Calypogeia Neesiana*, *Lophozia longiflora*, and *Riccia sorocarpa* for Staffordshire; and *Eucalyx hyalinus* for Warwickshire.—A. W. Evans.

574. ARNELL, H. W. Die schwedischen Arten der Gattungen *Diplophyllum* und *Martinellia*. Pflanzengeographische Skizzen. [The Swedish species of the genera *Diplophyllum* and *Martinellia*. Plant geographical sketches.] 8 vo., 82 p., 34 fig. Göteborg, Sweden, 1922.—The present paper is the 1st of a proposed series on the distribution of liverworts in Sweden. It is based on material in the herbaria of the author, the University of Uppsala, and the Royal Museum at Stockholm and thus makes no claims to be absolutely complete. Of the 2 genera discussed *Diplophyllum* is represented by 5 species in Sweden, so far as known, and *Martinellia* by 29. Under each species the distribution is noted in great detail, the separate stations being listed under the 28 political districts of Sweden. Each species is further accompanied by full notes on habitats, by a statement regarding the oldest known Swedish specimen, and often (especially in the case of recently described species) by critical remarks or descriptions. The following new combinations are proposed: *Martinellia cuspiduligera* (Nees), based on *Jungermannia cuspiduligera* Nees; *M. dentata* (Dum.), based on *Scapania dentata* Dum.; and *M. lingulata* (H. Buch), based on *S. lingulata* H. Buch. *Scapania helvetica* Gottsche, which is considered identical with *S. geniculata* Massal., is reduced to synonymy or varietal rank under *M. irrigua* (Nees) Lindb. The paper contains in addition a revision of the species occurring in Siberia and also notes on a few specimens from various scattered localities. According to the data at hand 3 species of *Diplophyllum* and 16 of *Martinellia* are now known from Siberia, including the recently described *M. tundrae* Arnell (see following entry), and 4 of these species represent additions to the flora of that country. As an addition to the flora of Norway, *M. scandica* Arnell & H. Buch [see Entry 576, this issue] is cited. The figures represent graphically the distribution of the various species according to the 28 divisions of Sweden.—A. W. Evans.

575. ARNELL, H. W. *Martinellia tundrae* Arnell, nova species. Bot. Notiser 1921: 289-291. 9 fig. 1921.—The species here described and figured under the above name was based on material collected by the author at Dudinka, Yenisei, Siberia, in August, 1876. It is assigned to the *M. undulata*-group.—A. W. Evans.

576. ARNELL, H. W., et H. BUCH. *Martinellia scandica* nov. spec. Bot. Notiser 1921: 1, 2. 1921.—The new species described under the above name was based on material from Sweden and Finland. It is assigned to the *M. curta*-group.—A. W. Evans.

577. BARTRAM, EDWIN B. Some Nova Scotia mosses. Rhodora 24: 121-124. 1922.—The author lists 35 species of mosses from central and southwestern Nova Scotia, based on his collections of July, 1921. Of these species *Sphagnum macrophyllum* Bernh., which is new to Canada, and *Grimmia Olneyi* Sulliv. are especially noteworthy. Full data regarding stations and occasional descriptive or critical notes are included.—M. L. Fernald.

578. BROECK, H., VAN DEN. De Muscineën. [The Muscineae.] Natuurwetenschapp. Tijdschr. 4: 86-88. 1922.—The author gives the distinctive features of 21 mosses and 6 hepatics found in the vicinity of Antwerp, Belgium.—A. W. Evans.

579. DUPLER, A. W. The male receptacle and antheridium of *Reboulia hemisphaerica*. Amer. Jour. Bot. 9: 285-295. Pl. 14, 46 fig. 1922.—The male receptacle of this species is normally dorsal and posterior to the female receptacle. It is typically lunate in outline and sessile. The species is monoecious, although bisexual receptacles are occasionally found. The antheridia do not develop in strict acropetal succession, as Haupt states, but show a tendency to arise centrifugally. Several variations from the usual marchantiaceous type of development were found. The male receptacle seems to be a plastic structure, and the author believes it may represent an elementary stage of a branch-system, showing transitions from the "dorsal outgrowth" type to the "composite branch-system" type.—E. W. Sinnott.

580. HERZOG, TH. *Hypnum Lorentzianum* Mol. Eine bryogeographische Skizze. [Hypnum Lorentzianum. A moss-geographical sketch.] Krypt. Forsch. Bayer. Bot. Ges. München 5. 345-353. 2 fig. 1920.—The author discusses the geographical distribution and morphological features of "*Hypnum*" *Lorentzianum* in considerable detail. The species is largely confined to the region lying between the Rhine and Inn Rivers and may be regarded as one of the character-mosses of the northern foothills of the Alps. It occupies a somewhat isolated position among European species and should be known as *Brotherella Lorentziana* (Mol.) Fleisch., the genus *Brotherella* being mainly composed of species from eastern Asia. Although Fleischer places this genus between *Rhaphidostegium* and *Sematophyllum* the author considers it more closely allied to *Heterophyllum*.—A. W. Evans.

581. [HUSNOT, T.] [Rev. of: GYÖRFFY, I. Bryologische Seltenheiten XIII. (Bryological anomalies.) Hedwigia 63: 48-49. 3 fig. 1921 (see Bot. Absts. 11, Entry 1634).] Rev. Bryologique 48: 77. 1921.—The reviewer shows that the author's figures of coalesced capsules in *Bryum pallescens* are very similar to figures of *B. Donianum* published by Potier de la Varde in 1920 [see Bot. Absts. 7, Entry 1977]. He adds that anomalies of this type seem to be less rare in *Bryum* than in other genera.—A. W. Evans.

582. KRAUSE, ERNST H. L. Zweiter Nachtrag zur Rostocker Moosflora. [Second supplement to the Rostocker Moosflora.] 8 vo., 2 p. Rostock, 1922.—The original moss flora of Rostock and the 1st supplement have already been abstracted [see Bot. Absts. 11, Entries 2268, 2269]. In the 2nd supplement 6 mosses and 3 hepatics are added to the flora, additional data regarding other species are given, and several new combinations are formed.—A. W. Evans.

583. NAVEAU, R. *Sphagnum Vandenbroeckii* n. sp. R. Nav. Natuurwetenschapp. Tijdschr. 4: 144, 145. 2 fig. 1922.—Under the above name the author describes a new species of *Sphagnum* from Ruwenzori in the Lamuri-Congo, Africa. It was based on material collected by Bequaert.—A. W. Evans.

584. PEARSON, WM. HY. Notes on a collection of Hepaticae from Belgian Congo (ex herb. R. Naveau, Antwerp). Natuurwetenschapp. Tijdschr. 4: 118-143. Pl. 1-13. 1922.—The present report is based on a series of specimens collected in various parts of the Belgian Congo, Africa, by Corbisier, Lacomblez, Poma, Vanderyst, and Vermoesen. The species listed number 26, of which the following are proposed as new and figured: *Acrolejeunea Orchidae*, *Eulejeunea compressistipula*, *Frullania platyflora*, *Lopholejeunea Vermoesenii*, *Mastigolejeunea Lacomblezii*, *Plagiochila fragilifolia*, *P. Naveauiana*, *P. Poma*, *P. strictifolia*, *Prionolejeunea Corbisieri*, *P. uncatifolia*, and *Riccia radicata*. Full data regarding localities are given in each case, and many of the species are accompanied by critical remarks.—A. W. Evans.

585. POTIER DE LA VARDE, R. Observations sur quelques espèces du genre *Fissidens*. [Observations on certain species of the genus *Fissidens*.] Rev. Bryologique 48: 70-72. 1921. The earlier parts of the series to which this article belongs have already been abstracted [see Bot. Absts. 8, Entry 1270]. In the present part the author records *Fissidens Monguilloni* Thériot for the 1st time from the French departments of Vendée and Loire-Inférieure. He

then discusses No. 158 of Husnot's Musci Galliae. This specimen was collected in Monaco and distributed as *F. incurvus* Schwaegr.; it should, however, be referred to *F. Bambergeri* Schimp., the distinctive characters of which are enumerated.—A. W. Evans.

586. SCHADE, A. Die Lebermoosflora der Oberlausitz. [The liverwort flora of the Upper Lausitz.] Festschr. zur Feier des 75 jähr. Bestehens der Naturwissenschaftl. Ges. Isis in Bautzen. 22 p. 1921.—The liverworts of eastern Saxony (in which the Upper Lausitz is situated) and the neighboring parts of Bohemia have received the attention of several students of the Hepaticae, and the author has incorporated the results of earlier explorations with his own. The species enumerated for this region total 135, of which 5 represent additions to the flora of Saxony. Each species is accompanied by full data regarding stations and collectors. The following are among the more interesting species listed: *Calypogeia arguta* Mont. & Nees, *Hygrobiella laxifolia* (Hook.) Spruce, and *Madotheca Porella* (Dicks.) Nees. In the author's opinion the 1st represents a recent introduction while the other 2 should be regarded as probable relicts of the Glacial Period.—A. W. Evans.

587. THÉRIOT, I. Contribution à la flore bryologique du Chili. [Contribution to the bryological flora of Chile.] Rev. Chilena Hist. Nat. 25: 289-312. Pl. 23-27. 1921.—This is the 4th article published by the author under the above title; the 3rd has already been abstracted [see Bot. Absts. 4, Entry 1042]. The present report is based mainly on specimens collected by J. A. Campo, N. Costes, C. Deltor, and F. Jaffuel in various parts of Chile. The species listed number 48 and are accompanied by full data regarding localities and also, in many cases, by descriptive notes. The following species are proposed as new, Thériot being the authority except where otherwise indicated: *Barbula Costesii*, *B. fuscoviridis* Broth., *Brachysteleum Deltori*, *Fissidens Costesii*, *Funaria Costesii*, *Orthotrichum bicolor*, *Pentastichiella Jaffueli*, *Pleuroidium Costesii*, *Tortula atrata*, *T. Costesii*, and *Zygodon Jaffueli*. In addition *Pseudocrossidium pachyneuron* (Dusén) Thériot, based on *Barbula pachyneura* Dusén, is proposed as a new combination, and new varieties are described under *Fissidens Brotherianus* Par., *Macromitrium paraphysatum* Mitt., and *Tortula papillosa* Wils. Thériot's new species, 2 of his new varieties, and *Orthotrichum assimile* C. M. are figured on the accompanying plates.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 181, 183, 184, 198, 223, 410, 531, 718, 758, 780, 788, 789, 808, 812, 820, 821, 863, and those in Section Pathology)

FUNGI

588. BLUMER, S. Beiträge zur specialisation der Erysiphe horridula Lév. auf Boraginaceen. [Contributions on the specialization of Erysiphe horridula Lév. on the Boraginaceae.] Centralbl. Bakt. II Abt. 55: 480-505. Fig. 1. 1922.—A biological and morphological study of the forms of *Erysiphe cichoracearum* on the Compositae and Boraginaceae is reported. The forms on the Boraginaceae are placed under a separate species, *E. horridula*; the weaker specialization and the more uniformly 3-spored asci of the forms on the borages are taken as the bases of separation.—Anthony Berg.

589. BOURDOT, H., et A. GALZIN. Hyménomycètes de France. (VII Stereum) suite. [Hymenomycetes of France.] Bull. Trimest. Soc. Mycol. France 37: 117-130. 1921.—The author continues his treatment of the genus *Stereum*, describing 17 species. [See also Bot. Absts. 10, Entry 1206.]—D. S. Welch.

590. BOURDOT, H., et L. MAIRE. Notes critiques sur quelques Hyménomycètes nouveaux ou peu connus. [Some new or little known Hymenomycetes.] Bull. Trimest. Soc. Mycol. France 36: 69-85. 1 fig. 1920.—Species from the following genera are described and discussed: *Platyglœa*, *Ezidia*, *Tremella*, *Sebacina*, *Ezidiopsis*, *Bourdotia*, *Ditiola*, *Clavaria*, *Corticium*, *Peniophora*, *Grandinia*, *Asterostromella*, *Hypochnus*, *Phylacteria*, *Tomentella*, *Trametes*, *Leptosporus*, *Irpez*, *Poria*, *Xanthochrous*.—D. S. Welch.

591. BROQ-ROUSSEAU, M. Les recherches mycologiques en médecine vétérinaire. [Mycological researches in veterinary medicine.] Bull. Trimest. Soc. Mycol. France 37: 99-103. 1921.—A laboratory for veterinary research has been established by the minister of war. Attention is called to the fact that many diseases of horses are caused by fungi. The following are reported: Favose thrush caused by a fungus referred to *Achorion gypseum* Bodin. Microsporic thrush, of which 2 cases are reported; from one of these Sabouraud isolated *Microsporon lanosum*, and in another Bodin describes *M. equinum*. Four species of *Trichophyton* have been reported to cause Trichophytic thrush. The perfect stages of these forms are for the most part unknown. It has been suggested that they belong to the Gymnoascaceae. Sporotrichosis is caused in horses as in man by *Sporotrichum Beurmanni* Matruchot & Ramond. Epizootic lymphangitis, caused by a *Cryptococcus* of uncertain relationships, is confined to Africa. The streptothrix group is widely distributed and contains among other organisms the one causing actinomycosis of man and animals. A Streptothrix has been found causing decomposition in grain and forage. Mouldy or decayed feed has been held responsible for cases of severe poisoning.—D. S. Welch.

592. BUBÁK, FR. Fungi aus Mesopotamien und Kurdistan, sowie Syrien und Prinkipo. Nachträge. [Fungi from Mesopotamia and Kurdistan, also Syria and Prinkipo.] Ann. Naturhist. Mus. Wien 34: 69. 1921.—Two species, *Tichothectum erraticum* Mass. and *Lindauopsis* sp., are added to a preceding article [op. cit. 28: 189].—A. S. Hitchcock.

593. BUCHHEIM, ALEXANDER. Zur Biologie von *Uromyces Pisi* (Pers.) Winter. [On the biology of *Uromyces Pisi*.] Centralbl. Bakt. II Abt. 55: 507-508. 1922.—In culture studies made near Moscow uredospores of *Uromyces Pisi* from *Lathyrus pratensis* L. infected *Pisum sativum* L., *P. arvense* L., *Lathyrus Nissolia* L., and *L. articulatus* L. This confirms Jordi's conclusion that the fungus on *Pisum* and *Lathyrus* is the same.—M. A. Raines.

594. CHIFFLOT, J. Sur quelques troubles provoqués par l'Ingestion de *Inocybe rimosa* B. [Trouble caused by eating *Inocybe rimosa*.] Bull. Trimest. Soc. Mycol. France 37: 139-140. 1921.—*Inocybe rimosa* although commonly regarded as an edible species is reported to be poisonous when eaten in large quantity.—D. S. Welch.

595. CHIFFLOT, [J.] Un champignon de 20 kilos. [A fungus weighing 20 kilos.] Bull. Trimest. Soc. Mycol. France 37: 138-139. 1921.—A very large specimen of *Polyporus sul-fureus* was sent to the author for identification.—D. S. Welch.

596. HEDGCOCK, GEORGE G., and GLENN GARDNER HAHN. Two pine cone rusts and their new cronartial stages. Part I. *Cronartium strobilinum* (Arthur) Hedgc. and Hahn, comb. nov. Phytopathology 12: 109-116. Pl. 6. 1922.—A rust of the cones of *Pinus palustris* formerly attributed to *Caeoma strobilina* Arth. has been known to occur in Florida and nearby territory since 1892. It has also been found on cones of *Pinus heterophylla* throughout the same range. Recently the authors have found that the aecial sori possess a peridium like the true *Peridermiums*. A *Cronartium* which occurs on the leaves of *Quercus virginiana* and of *Q. geminata* has been proved, by cross inoculations in the greenhouse, to be the alternate stage of the fungus. The leaves of several other species of *Quercus* and also species of *Castanea* have been successfully inoculated with aeciospores from the pine cones; but teliospores were not produced on deciduous leaves. The fungus is redescribed as *Cronartium strobilinum* (Arth.) comb. nov.—B. B. Higgins.

597. HEDGCOCK, GEORGE G., and N. REX HUNT. Two pine cone rusts and their new cronartial stages. Part II. *Cronartium conigenum* (Pat.) Hedg. & Hunt, comb. nov. *Phytopathology* 12: 116-122. Pl. 6. 1922.—The aecial sori of *Caeoma conigenum* which occur on the cones of *Pinus chihuahuana* possess a true peridium. The alternate stage is a *Cronartium* which occurs on the leaves of *Quercus Emoryi* and *Q. hypoleuca*. The fungus is re-described as *Cronartium conigenum* (Pat.) comb. nov.—B. B. Higgins.

598. HUNTER, ALBERT C. A pink yeast causing spoilage in oysters. U. S. Dept. Agric. Bull. 819. 24 p. 1920.—The organism causing a pink color in shipped oysters is a yeast-like fungus belonging to the group *Torulaceae*. It was found in large numbers in the oyster-house and on utensils in and about the house, less frequently in oysters before they were brought to the house. For the purpose of preventing the infection of opened oysters, the house and utensils should be washed occasionally, through the opening season, with a 1-2500 formaldehyde solution (formalin 1-1000).—D. S. Welch.

599. LEBEDIEVA, L. A. Fungi novi in horto botanico Petropolitano annis 1921-22 collecti. [New fungi collected in 1921-22 in the botanical garden of Petrograd.] *Notulae Systematicae Inst. Cryptogamico Hort. Bot. Petropolitani* 1: 62. 1922.—A new species of the *Sphaeropsidaceae* occurring on dead branches of species of *Spiraea* and *Sorbaria* is described. It is considered the pycnidial stage of *Scleroderris Spiraeae* Rehm, which was found on the same branches. This fungus, named *Sirodiplospora Spiraeae* Lebed., is very close to *Sirodiplospora sambucina* Naumov on *Sambucus racemosa*, which seems to be the pycnidial stage of *Scleroderris sambucina* Naumov. (Both forms were discovered in Tsarskoie Selo near Petrograd and described by N. Naumov.)—A. Jacewski.

600. VUILLEMIN, M. P. Quelques formes thermophiles de l'*Aspergillus glaucus*. [Some heat-resistant forms of *Aspergillus glaucus*.] *Bull. Soc. Sci. Nancy* 1: 15-16. 1920.—Four races of *Eurotium repens* enduring a temperature of 38°C. were studied. The material was secured from (1) pus from a felon; (2) gangrenous lesion in frozen feet; (3) inflamed groin; (4) lymph of the cheek. The last case was conclusive because the perithecia developed in the midst of living tissues, were extracted with every precaution, and by culture reproduced *Aspergillus glaucus* and the perithecia characteristic of a variety of *Eurotium repens*.—A. Chase.

LICHENS

601. KEISLER, KARL. Systematische Untersuchungen über Flechten-Parasiten und Lichenoiden Pilze. [Systematic investigations on parasitic lichens and lichen-like fungi.] *Ann. Naturhist. Mus. Wien* 34: 70-78. 1921.—This is Part 2, nos. 12-20 of the contribution [1st part in *Beih. Bot. Centralbl.* 37: 263. 1920]. The following are discussed: 12. *Didymella tiliaginea* and *Sphaerulina tiliaris*; 13. *Myarthopyrenia Sorbi* n. gen. et n. sp., on *Sorbus Aucuparia*, Austria; 14. *Agyrium hepaticolum* n. sp., Austria; 15. *Pleionoscutula Brouardii*; 16. *Durella Lecideola* var. *coeruleo-viridis* n. var., Poland; 17. *Lecanidium Bachmannianum* n. sp., Poland; 18. *Cyrtidula nostochinea*; 19. *Cyrtidula pteleodes*; 20. *Aposphaeria Cladoniae* and *Phoma uncialicola*.—A. S. Hitchcock.

602. STEINER, J. Lichenes aus Mesopotamien und Kurdistan sowie Syrien und Prinkipo. [Lichens from Mesopotamia and Kurdistan, also Syria and Prinkipo.] *Ann. Naturhist. Mus. Wien* 34: 1-68. 1921.—An annotated list is presented of lichens collected by Handel-Mazzetti, with numerous new forms, varieties and species, and new combinations. The new species are: *Verrucaria emergens*, Syria; *V. syriaca*, Syria; *V. sordidula*, Mesopotamia; *Thelidium myriocaroides*, Syria; *Staurothele praecedens*, eastern Kurdistan; *Biatorella leucothallina*, near Aleppo; *Acarospora Bornmülleri*, Mesopotamia; *A. Handelii*, Mesopotamia; *Gonohymenia mesopotamica*, Mesopotamia; *Lecanora kurdistanica*, western Kurdistan; *L. amylophora*, Syria; *L. radians*, Bitlis [Armenia]; *L. subfarinosa*, Mesopotamia; *L. syriaca*, Syria; *L. kjachensis*, northern Mesopotamia and Kurdistan; *L. ferruginea*, Syria; *Caloplaca fuscula*, Mesopotamia; *C. Handelii*, Mesopotamia.—A. S. Hitchcock.

BACTERIA

603. AYERS, S. HENRY, and COURTLAND S. MUDGE. **The streptococci of the bovine udder. IV Studies of the Streptococci.** Jour. Infect. Diseases 31: 40-50. 1922.—Methods of isolation and the special technique of the cultural methods used for the differentiation of the different types are described. *Streptococcus mastitidis* was found to be the prevalent type in the udder of the cow, it being found in normal animals. It is differentiated from the closely allied *S. pyogenes* on the basis of final pH and difference in ability to hydrolyze sodium hippurate. It is not believed that *S. mastitidis* is pathogenic for man when consumed in milk. Due to the small amount of acid produced in test substances, a new species has been described and named *Streptococcus acidominimus*.—R. V. Allison.

604. FABRY, PAUL. **Note sur le Bacille coli modifié ne produisant plus d'indol.** [A note on a modified form of *Bacillus coli* which does not produce indol.] Compt. Rend. Soc. Biol. 87: 113-115. 1922.

605. LACY, G. R., and A. C. MURDOCH. **Encapsulated non-gas-forming bacilli.** Jour. Infect. Diseases 31: 64-71. 1922.—The morphological, cultural, and immunological characteristics of an encapsulated, non-gas-forming, aerobic bacillus as isolated from 3 patients suffering with some pathologic condition of the genito-urinary tract are presented. It was not found possible to determine whether the organism was the primary etiologic factor or only a secondary invader. The brief literature upon this type of organism is reviewed and the need of further study of the general group emphasized.—R. V. Allison.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 131, 207, 227, 262, 543, 914)

606. BERRY, EDWARD W. **Additions to the flora of the Wilcox group.** U. S. Geol. Surv. Professional Paper 131: 1-21. Pl. 1-18. 1922.—Additions to the lower Eocene flora of the Mississippi embayment region are described. Plant lists from new localities, various previously known species, taxonomic changes, and the following new species are included: *Marchantites stephensoni*, *Aerostichum* sp., *Cupressinoxylon wilcoxense*, *Palmocarpon butlerensis*, *Artocarpoides balli*, *Menispermites cebathoides*, *Monocarpellites perkinsi*, *Sterculia wilcoxensis*, *Helictoxylon wilcoxianum*, *Laurus verus* (fruits), *Laurinoxylon wilcoxianum*, and *Pterobalanus texanus* (a new genus of winged fruits).—E. W. Berry.

607. BERRY, EDWARD W. **Saccoglottis, recent and fossil.** Amer. Jour. Sci. 4: 127-130. 1922.—*Saccoglottis tertiaria* n. sp. from the Pliocene of Bolivia is described and *S. amazonica* is recorded from Panama Bay. Distribution and means of dispersal are discussed.—E. W. Berry.

608. BERRY, EDWARD W. **The geologic evidence of evolution.** Sci. Monthly 15: 97-118. 1922.—This article is a brief summing up in non-technical language of the geological evidence of evolution.—“Evolution is not a theory of origins, nor an article of scientific faith, but an indisputable fact.” It should not be confused with the various theories that have been proposed to explain its factors or mode of operation.—The first man to see the transformation of species was Waagen, an Australian geologist who studied the minute changes in the successive species of *Ammonites* in the successive layers of the Jurassic. Other groups show the same thing; *Archaeopteryx* of the Jurassic, the elephants of the Miocene and Pliocene, the horses of the Cenozoic, and finally the record of man himself, with special mention of the recently discovered skeletons.—L. Pace.

609. CHANEY, R. W. Notes on the flora of the Payette formation. Amer. Jour. Sci. 4: 214-222. 1922.—A partial account is presented of the flora of the Payette formation of Idaho and adjacent areas in Oregon and which was formerly considered to be upper Eocene in age. The author makes additions to this flora—bringing the total number of species up to 49, discusses the environment which they indicate, and concludes that the age is Miocene.—E. W. Berry.
610. FRENTZEN, K. Beiträge zur Kenntnis der fossilen Flora des südwestlichen Deutschland. [Contribution to the fossil flora of southwestern Germany.] Jahresber. u. Mitteil. Oberrhein. Geol. Ver. N. F. 10: 63-73. 1921; 11: 1-14. 1922.—The 1st contribution gives an account of the author's studies of late Triassic florules from Adelshausen, Rappersweiler, and Malsch in southwestern Germany. The 2nd consists of a brief comparison of the Keuper flora of Baden, Thuringia, and adjacent regions with that contained in the Schilf sandstone of the same areas.—E. W. Berry.
611. GILKINET, ALF. Flore fossile des Psammites du Condroz. [Fossil flora of the upper Devonian of Condroz.] Mém. Soc. Géol. Belgique 1921-1922: 1-21. Pl. 1-13. 1922.—The following typical upper Devonian species from Condroz, Belgium, are described: *Sphenopteris condrosorum*, *S. flaccida*, *S. Schimperiana*, *Triphylopteris elegans*, *Archaeopteris Roemeriana*, *Asterocalamites scrobiculatus*, and *Lepidodendron nothum*.—E. W. Berry.
612. GILKINET, ALF. Plantes fossiles de l'argile plastique d'Andenne. [Fossil plants from the plastic clay of Andenne.] Mém. Soc. Géol. Belgique 1921-1922: 23-40. Pl. 14-17. 1922.—The following species of Aquitanian or lower Miocene age are recorded from the clay pits of Champseau near Andenne, Belgium: *Sphaeria lignitum*, *Lygodium Gaudini*, *Salvinia cordata*, *Sequoia Couttsiae*, *Taxodium distichum miocenicum*, *Phragmites oeningensis*, *Rhizocaulon gypсорum*, *Stratiotes Websteri*, *Alnus Kefersteini*, *A. gracilis*, *Populus glandulifera*, *Nyssa* sp., *Comptonia Schrankii*, *Cinnamomum Scheuchzeri*, *C. lanceolatum*, *Gardenia Wetzleri*, *Echintonium cuspidatum*, *Acer trilobatum* and its variety *cuspidatum*, and *Ilex Dardenniana*. The last is the only new species. From these same clays but of unknown age are described cones of *Pinus sylvestris*, *P. Laricio*, and *P. Pinaster*? These last are late Tertiary or Pleistocene.—E. W. Berry.
613. HYLANDER, C. J. A Mid Devonian Callixylon. Amer. Jour. Sci. 4: 315-321. 1922.—The author describes *Callixylon Marshii* n. sp., a type of Cordaitan wood with segregated groups of pits, and in this species showing growth rings. The specimen is from the Devonian of 18 Mile Creek, New York.—E. W. Berry.
614. IWASAKI, C. A fundamental study of Japanese coal. Tech. Rept. Tohoku Imp. Univ. 24: 1-41. Pl. 1-9. 1922.—A continuation of the author's previously published work on the technology of Japanese coals.—E. W. Berry.
615. JOHANSSON, NILS. Die Rätische Flora der Kohlengruben bei Stabbarp und Skromberga in Schonen. [The Rhaetic flora of the coals of Stabbarp and Skromberga in Schonen] K. Svensk. Vetenskap. Akad. Handl. 63^a: 1-78. Pl. 1-8. 1922.—A monographic account is given of the Rhaetic or late Triassic flora of these 2 localities in southern Sweden. The flora comprises 4 Equisetales, 1 Lycopodiales, 18 Filicales, 11 Cycadophyta, 7 Ginkgophyta, 6 Coniferophyta, and 2 plants of unknown affinities. It consists for the most part of well known Rhaetic types. Considerable is added to our knowledge of some of these and the following are described as new: *Cladophlebis Svedbergii*, *C. sublobata*, *C. Sewardii*, *C. divaricata*, *Cycadolepis rugosa*, and seeds of the cycadophyte genus *Nilssonsonia*.—E. W. Berry.
616. JOHANSSON, NILS. Pterygopteris eine neue Farngattung aus dem Rät Schonen. [Pterygopteris, a new fern genus from the Rhaetic of Sweden.] Ark. Bot. 17: 1-6. Pl. 1. 1922.—A new genus of ferns based upon *Polypodites*? *Angelini* Nathorst is described from the

upper Triassic of southern Sweden. Comparisons are made with *Laccopteris* and *Dictyophyllum* and the author concludes that the systematic position of *Pterygopteris* cannot be satisfactorily determined at present.—E. W. Berry.

617. KEIDEL, J. Sobre la distribución de los depósitos glaciares del Pérmico conocidos en la Argentina y su significación para la estratigrafía de la serie de Gondwana y la paleogeografía del hemisferio austral. [On the distribution of Permian glacial deposits in Argentina and their significance in the paleogeography and stratigraphy of the Gondwana series.] Bol. Acad. Nacion. Cien. Córdoba 25. 1922.—A summary account is given of the occurrences of Permian glacial deposits in Argentina and a discussion of the contained *Glossopteris* flora and of the paleogeography of Gondwana Land.—E. W. Berry.

618. KNOWLTON, F. H. A fossil dogwood flower. Amer. Jour. Sci. 4: 136-138. 1922.—A fossil flower, *Cornus speciosissima* n. sp., from the Fort Union (lower Eocene) of Wyoming is described.—E. W. Berry.

619. KODAIRA, R. Fossil nut-shells of *Juglans Sieboldiana* Maximovicz in the lignite of Asahi-yama, near Nagano City, Province of Shinano. Jour. Geol. Soc. Tokyo 23: 1-8. Pl. 12. 1921.—The age is Pleistocene; the remaining facts are set forth in the title.—E. W. Berry.

620. KRÄUSEL, R. Der Bau des Wundholzes bei fossilen und rezenten Sequoien. [The structure of traumatic wood in fossil and recent Sequoias.] Senckenbergiana 3⁴: 135-142. 1921.—The author discusses the relationships between fossil and recent species of *Sequoia* and *Taxodium* as shown by the structure of the traumatic areas of the wood, referring several fossil types such as *Cupressinoxylon wellingtonioides* Kräusel, *C. taxodioides* Platen, *C. Holdenae* Seward, *Taxodioxylon sequotianum* Kräusel, and *T. Credneri* Platen to *Sequoia*.—E. W. Berry.

621. KRÄUSEL, R. Die Nahrung von Trachodon. [The food of Trachodon.] Palaeontol. Zeitschr. 4: 80. 1922.—From a mass of sandy carbonaceous matter inside the cadaver of the dinosaur *Trachodon* the author identifies the needles of *Cunninghamites elegans*, fragments of coniferous and dicotyledonous foliage, seeds or fruits, pollen, and eyes of water insects.—E. W. Berry.

622. KRÄUSEL, R. Fossile Hölzer aus dem Tertiär von Süd-Sumatra. [Fossil woods from the Tertiary of southern Sumatra.] Verhandl. Geol. Nederland. u. Kolonien, Geol. Ser. 5: 231-287. Pl. 1-7, fig. 1-29. 1922.—The following new species of woods from the Tertiary, mostly Miocene, of Java, are described: *Djambioxylon sumatrense*, possibly belonging to the Combretaceae; *Dipterocarpoxyton Tobleri*, and 2 unnamed forms of the same genus; *Sapindoxylon Janssonii*; *Anacardioxylon Mollii*, *Caesalpinioxylon palembangense*; *Palmoxyton laudjungense*; and *Tarrietioxylon sumatrense*, which is related to the existing genus *Tarrietia* of the Sterculiaceae.—E. W. Berry.

623. KRÄUSEL, R. Über einige fossile Koniferenhölzer. [On several fossil coniferous woods.] Senckenbergiana 3⁴: 129-135. 1921.—The author discusses *Palatodioxylon Grünwattersbachense* Frentzen, a coniferous wood from the Bunter (lower Triassic) of Baden advancing arguments tending to prove its Araucarian affinity instead of its supposed Abietinean relationship as suggested by its describer. The author discusses also *Pityoxylon Schenkii* Kraus, a Tertiary species, showing its relationship with the *Sequoia* rather than with the *Pinus* types of fossil woods.—E. W. Berry.

624. NATHORST, A. G. Einige Psymnophyllum-Blätter aus dem Devon Spitzbergens. [Several Psymnophyllum leaves from the Devonian of Spitzbergen.] Bull. Geol. Inst. Upsala 18: 1-8. Pl. 1. 1922.—*Psymnophyllum Williamsoni* and a new species, *Psymnophyllum pusillum* (Ginkgoales), from the upper Devonian of Spitzbergen are described.—E. W. Berry.

625. ROUND, EDA M. A *Crossothea* from the Rhode Island Carboniferous. Amer. Jour. Sci. 4: 131-135. 1922.—*Crossothea nana*, a new species, from the Carboniferous of the Narragansett basin in Rhode Island is described and compared with various European species.—E. W. Berry.

626. SEAWARD, A. C. Fossil plants from the Tanganyika Territory. Geol. Mag. 59: 385-392. Pl. 17. 1922.—*Eretmophyllum?*, *Ulmannia*, and *Voltzia*, all poorly preserved, and, according to the author indicating a Triassic age, are recorded from the Tanganyika district in Africa.—E. W. Berry.

627. THOMAS, H. H. On some new and rare Jurassic plants from Yorkshire. V. Fertile specimens of *Dictyophyllum rugosum* L. and H. Proc. Cambridge Phil. Soc. 21: 110-116. Pl. 1. 1922.—The sporangial characters and the venation seem to indicate that the nearest living relative of the Jurassic *Dictyophyllum rugosum* is the modern *Cheiropleuria bicuspis*.—Michael Levine.

628. WENZ, W. Das Mainzer Becken und seine Randgebiete. [The Mainz basin and surroundings.] Willy Ehrig: Heidelberg. 1921.—In this account of this classic region for Tertiary geology the author lists and figures the fossil plants from the various Tertiary horizons represented in that region.—E. W. Berry.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 4, 17, 23, 24, 31, 57, 72, 82, 87, 90, 97, 115, 116, 117, 143, 152, 153, 165, 166, 169, 171, 181, 198, 203, 285, 335, 343, 345, 358, 366, 402, 420, 422, 428, 430, 439, 442, 452, 461, 464, 466, 473, 474, 481, 487, 503, 542, 591, 732, 758, 766, 771, 789, 790, 811, 815, 821, 844, 848, 896)

DISEASES CAUSED BY FUNGI

629. ANONYMOUS. Cocoe rot. Jour. Jamaica Agric. Soc. 26: 62-64. 1922.—A wilt and tuber rot of cocoas or tancias (*Colocasia* sp.) due to a vascular parasite (*Hormiscium Colocasiae* Ashby) has caused severe losses to the crop in Jamaica.—John A. Stevenson.

630. ANONYMOUS. Potato blight. Jour. Jamaica Agric. Soc. 25: 371-373. 1922.—A serious epidemic of potato blight (*Phytophthora infestans*) due to wet weather and late planting reduced the crop from one half to two thirds. Lowland plantings escaped the disease. Spraying with Bordeaux mixture is recommended.—John A. Stevenson.

631. ALLEN, W. J., and J. M. ARTHUR. Orchard experiments. Sprays for peach curl on trial at Yanco. Agric. Gaz. New South Wales 33: 442-446. 2 fig. 1922.—Lime-sulphur on dormant trees controlled peach leaf curl effectively. Spraying when the buds were bursting was less effective and still less so when the buds were "pinking." A 2nd spraying, after the 1st dormant spraying, showed no increased efficiency. Results indicated that lime-sulphur diluted more than the standard formula (1 to 7) was effective. Further trials are needed.—L. R. Waldron.

632. BAUDYŠ, E. Plísen bramborová. [Late blight of potato.] Naše Snahy 9: 111-113. 1921.—All varieties are not equally affected by this disease. In comparative experiments which were performed in an experimental field on the Czecho-Moravian plateau the most susceptible variety was "Up-to-date," which was practically destroyed by the disease.

Slightly less susceptible were the varieties Bílý semenáč, Viktorka, Magnum bonum, Holandeské ranné, Kaplanka, Jiriny, and Industrie. About 15 per cent of diseased tubers were found in the varieties Prof. Märcker, Potentat, Zlocien, Erfolg, Hassia, Ceres, Phönix, Cedan, Gracia, Pyselske, Česky, Skrobák, and Silesia. Varieties almost entirely healthy were Pac, Galathea, Prof. Woltman, Zelenáč, Regent, Koruna, Vločkove, Swietéz, Gedymin, Svatová, Clavské, Deodara, and Topor. In the experimental field in Moravia the variety Prof. Woltman had about 50 per cent of diseased tubers; Koruna, 15 per cent; and Zlocien, about 25 per cent. The first 2 varieties were resistant in the experimental field on the Czecho-Moravian plateau, and the 3rd variety was slightly susceptible. Spraying with Bordeaux mixture is recommended for the control of the disease.—*E. Baudyš*.

633. [BAUDYŠ, E., a FR. STRAŽÁK.] Moření osiva proti plísni sněžné. [Treatment of the seed against snow mold.] Československý Zemědělec 3: 133-134. 1921.—The damage done by this disease (*Fusarium nivale*) is estimated to be 20 per cent, which in 1920 amounted to about 1,800,000 quintals of grain. In some places the damage is as high as 80 per cent. The disease attacks rye, wheat, and frequently winter barley. For control are recommended sublimate, uspulium, and fusariol. According to Baudyš, treatment with sublimate is most effective.—*E. Baudyš*.

634. BRERETON, W. LE GAY, and C. O. HAMBLIN. Black spot of the vine (*Gloeosporium ampelophagum*). Experiments with controls, 1920-21. Agric. Gaz. New South Wales 33: 433-436. 3 fig. 1922.—The experiments were conducted (1) to determine the best winter swabs and sprays, (2) to test summer control sprays, and (3) to test late season sprays for ripening fruit. Only (1) is reported. The winter swab,—sulphate of iron and sulphuric acid,—delayed bursting of the buds about 10 days. Bordeaux spraying controlled downy mildew successfully. Winter spraying or swabbing did not control black spot at Yanco as the disease did not appear until late spring or early summer. Swabbing reduces the total amount of infective material upon the vines and so provides against an early attack of the disease.—*L. R. Waldron*.

635. BURGER, O. F., and H. C. PARHAM. Peronospora disease of tobacco. Florida State Plant Bd. Quart. Bull. 5: 163-167. 1 fig. 1921.—During the latter part of March and the beginning of April, *Peronospora Hyoscyamii* De Bary was noticed for the 1st time in Florida (Gadsden County). The disease may have been introduced from Sumatra. Large brown spots 0.5-1 inch in diameter develop on the leaves. At first these spots are yellowish green; later they have a water-soaked appearance; and finally they become brown and papery. The brown spots soon drop out, leaving holes in the leaf. Plants grown under slats and cheese cloth were infected most, flat-shade plants less, and sun-grown tobacco least. It is believed that spraying the seedbeds with 2-2-50 Bordeaux mixture may control the disease. It is impracticable to spray plants which have attained a height of 18-24 inches. The disease is confined to the sand leaves, and the loss is probably not more than 1 per cent of the crop.—*J. C. Th. Uphof*.

636. CASTRO, CARLOS. Enfermedades del jitomate. [Tomato diseases.] Bol. Camara Agric. Nacion. Leon [Mexico] 9: 4-6. 1922.—*Fusarium Lycopersici* and *Phytophthora infestans* attack the tomato.—*John A. Stevenson*.

637. CHASE, W. W. Experimental dusting and spraying of peaches for 1919. Georgia State Bd. Entomol. Circ. 30. 13 p. 1920.—Results showed that dusts of sulphur, lime, and lead arsenate gave as good results in the brown rot control as liquid sprays and that the dusts were better for scab control. Curculio control on varieties as late as Elberta was not satisfactorily effected by dusts or sprays as the season was abnormal in rains. The amount of arsenate of lead recommended against curculio is 5 per cent.—*T. H. McHatten*.

638. CIFERRI, R. Il marciume delle mele cotogne. [A rot of quince.] Riv. Patol. Veg. 12: 12-17. 1922.—A rot of quinces was found to be caused by *Penicillium crustaceum* (L.) Fries. Various anomalous forms of the fungus are described.—*F. M. Blodgett*.

639. COTTON, A. D. Potato pink rot: a disease new to England. Jour. Ministry Agric. Great Britain 28: 1126-1130. 1922.—The occurrence of the pink rot (*Phytophthora erythroseptica* Pethyb.) disease of potatoes was noted in 7 localities in 2 districts. Though this is the 1st discovery of the disease in England it is not necessarily implied that it then occurred in England for the 1st time; it may have been present and mistaken for blight in former years.—Affected plants present a “wilted” appearance and the tubers generally rot, the rot progressing from the stem to the eye end of the tubers.—M. B. McKay.

640. DOUGLAS, BRUCE. A new *Alternaria* spot of tomatoes in California. Phytopathology 12: 146-148. Fig. 1. 1922.—A peculiar spotting of tomato fruits that has been quite prevalent during the damp weather of late fall in California, has been found to be due to a species of *Alternaria*. On the fruits the spots are brown, circular in outline, and somewhat sunken but firm. Later the spots become covered with a dark velvety growth of *Alternaria* spores. Inoculations from pure cultures of this fungus were made by placing spores suspended in sterile water in droplets on the uninjured green fruits. Spots developed in 10-21 days.—B. B. Higgins.

641. DUFRENOY, J. Les maladies du melon. [Diseases of cantaloupes.] Ann. Épi-phyties 7: 405-420. Fig. 1-16. 1921.—Cantaloupes grown in France suffer very much from a wilt disease, as many as 90 per cent of the plants being sometimes destroyed. A soil *Fusarium* was constantly isolated from diseased organs; it was successfully inoculated from cultures to seedlings, causing characteristic wilting, and reisolated to agar.—From morphological and cultural characters it is best referred to as *Fusarium Solani* var. *cyanescens* subvar. *melonis*.—Bacteria are always associated with *Fusarium*, infecting tissues in advance of the hyphae.—Resistant strains of cantaloupes should be bred from such individuals as prove *Fusarium*-resistant in badly infected fields. Resistance was proved to be due to rapid formation of suber, walling out infected wounds.—J. Dufrenoy.

642. GREGORY, C. T. The relation of rain to the formaldehyde treatment of onion smut. Phytopathology 12: 155-156. 1922.—Field results with the drip method formaldehyde treatment for onion smut (*Urocystis Cepulae* Frost) indicate that excessive rain at the time of or just after planting may reduce the beneficial effects of the treatment.—B. B. Higgins.

643. GRUYER, P. Observations sur la biologie du *Tuberculina persicina* Ditm. [Observations on the biology of *Tuberculina persicina*.] Bull. Trimest. Soc. Mycol. France 37: 131-133. 1921.—*Tuberculina persicina* Ditm. is parasitic upon the aecidia of *Endophyllum Euphorbiae*. The parasite delays or prevents the development of the aecidiospores. It is suggested that it might be used as an agent for the control of certain Uredinaceous pests.—D. S. Welch.

644. HOPKINS, E. F. Varietal susceptibility of the Yellow Bellflower apple to cedar rust. Phytopathology 12: 190-192. Fig. 1. 1922.—Aecia, identified as *Gymnosporangium Juniperi-virginianae* Schw., were found to be very prevalent on twigs of the Yellow Bellflower apple while none were found on any trees of the other varieties in the orchard.—B. B. Higgins.

645. KUTIN, AD. Snět prosová (Ustilago Panic-miliacei Vrt.). [Millet smut and a method of its control.] Ochrana Rostlin 1: 20-22. Fig. 1. 1921.—Millet smut may be entirely controlled with chemicals or by throwing the seed through the fire. In eastern Bohemia the latter method is applied as follows: As many straw torches are made as might be necessary. They are made from small bundles of long straw tied with ropes of twisted straw. Two men are necessary to carry out the operation; one takes a straw torch in each hand, lights them, and holds them about 1 m. above the ground. The torches have to be held close together so that a broad flame is obtained. The other man pours the seed slowly through the flame. The method is rapid, cheap, and effective. In the district of Kralové-Hradec (Königsgrätz) burning is done in a sieve over the flame, and in Moravia the seed is thrown directly into the fire made from short pieces of straw. Neither treatment affects the germination.—E. Baudyš.

646. LEWIS, A. C., and W. W. CHASE. Control of curculio and brown rot of peaches. Georgia State Bd. Entomol. Circ. 34. 4 p. 1921.—A spray schedule is given accompanied by a discussion of the relation of curculio to brown rot.—*T. H. McHatton*.

647. LINE, J. A note on the biology of the "crown-gall" fungus of lucerne. Proc. Cambridge Phil. Soc. 20: 360-365. 1921.—The author confirms the work of other students and ascribes the disease to *Urophlyctis Alfalfae* Lagerh. The name "marble gall" is again suggested to distinguish it from the crown gall of bacterial origin. The galls of the lucerne are hypertrophied buds or bud parts.—*Michael Levine*.

648. McCLELLAND, T. B. The coffee leaf-spot in Porto Rico. Porto Rico Agric. Exp. Sta. Bull. 28. 12 p., pl. 1-4. 1921.—The coffee leaf-spot due to *Stilbella flavidia* causes heavy losses in Porto Rico. In the higher altitudes with heavy rainfall defoliation results from the disease and many groves have been practically destroyed. An experiment was carried out on a portion of 1 of the plantations in which the disease was prevalent. In an area of about 2 acres all coffee trees were cut back to low stumps and all brush and weeds cleared out. Blank spaces were replanted. Bananas were planted around the edges of the plot to prevent the fungus from working in from adjoining infected trees. An effort was made to keep the area free of weeds, particularly those which were hosts of the fungus. The owners failed to carry out instructions as to weeding and even brought in diseased seedlings. Nevertheless, results were promising since at the end of nearly 4 years good yields were being obtained from the experimental plot in contrast to surrounding portions of the plantation, where yields were negligible.—*John A. Stevenson*.

649. MCCLINTOCK, J. A. Peach disease control. Georgia Agric. Exp. Sta. Bull. 139. 30 p., 6 fig. 1921.—The control of brown rot (*Sclerotinia fructigena* (Pers.) Nort.) on peaches is dependent upon the control of the curculio (*Conotrachelus nenuphar* Herbst.) as 90 per cent of the brown rot infections occur at curculio injuries. Mummied fruit left on trees and twig cankers are important sources from which conidia are disseminated in the spring. The blossom-blight form is the 1st indication of the disease in the spring. Blighted blossoms remain attached to the trees throughout the season and form sources of infection, and the growth of the fungus from the blighted blossoms into the twigs is one of the chief sources of canker formation and the wintering over of the disease. Thoroughly clearing the orchard after harvest coupled with spraying during the growing season will give effective control. Scab (*Cladosporium carpophilum* Thuem.) seems to be more serious on Belle than on Elberta. There seems to be little difference between dusting and spraying as to effective disease control. Calcium arsenate dusted on cotton in a young peach orchard caused serious injury to the young trees by burning the foliage.—*T. H. McHatton*.

650. MCCLINTOCK, J. A. Tomato wilt. Georgia Agric. Exp. Sta. Bull. 138. 12 p., 5 fig. 1920.—Tomato wilt (*Fusarium Lycopersici*), has discouraged the increase of tomato (*Lycopersicon esculentum*) acreage in Georgia. The fungus is widely spread in the Coastal regions and is becoming more so in the Piedmont section. The wilt generally attacks the plants when they are good sized and setting fruit, and is manifested by the yellowing and drooping of the leaves. Infected plants generally die within 10 days, but some remain alive until frost. Wilt resistant strains of tomatoes have been developed but these have not as yet proved safe and satisfactory. Investigations show that tomato wilt does not attack cotton, cowpeas, okra, and watermelons.—*T. H. McHatton*.

651. MAFFEI, LUIGI. La vaiolatura delle foglie dell' "*Arachis hypogaea*" Linn. dovuta a *Cercospora*. [Spotting of the foliage of *Arachis hypogaea* due to *Cercospora*.] Riv. Patol. Veg. 12: 7-11. 1922.—Dark chestnut-colored spots 1 cm. in diameter are caused on peanut leaves by a fungus that is named *Cercospora Arachidis* P. Henn. var. *macrospora* Maffei.—*F. M. Blodgett*.

652. MASSEY, L. M. **Black-spot and mildew of roses.** Amer. Rose Ann. 1922: 77-86. 1922.—Brief accounts of the life histories of *Diplocarpon Rosae* Wolf and *Sphaerotheca pannosa* (Wallr.) Lévl. var. *Rosae* Wor. are given, together with recommendations for control.—L. M. Massey.

653. MEIER, FRED C., CHARLES DRECHSLER, and E. D. EDDY. **Black rot of carrots caused by *Alternaria radicina* n. sp.** Phytopathology 12: 157-166. Pl. 11, fig. 1-2. 1922.—A rather destructive storage rot of carrots (*Daucus carota* L.) has been found at various points in the eastern U. S. A. The rot seems to develop irrespective of the method of storage in pits, in mounds, or in cellars. It is characterized by a progressive softening and blackening of the tissues of the roots. Infection usually occurs at the crown and passes down through the root; but occasionally infection occurs at other points on the surface of the root. A fungus which proved to be a new species of *Alternaria* was isolated from the decaying tissue. When inoculated through wounds into healthy carrot roots, this fungus produced a rot identical in appearance with that from which it was originally isolated. Under very favorable conditions infection was also obtained on the leaves; but such leaf infection was never found in the field. Comparison of this fungus with *Macrosporium carotae* Ellis showed very marked differences in the size and form of the spores and also in the growth produced upon various media.—B. B. Higgins.

654. MONTEALEGRE, MARIANO R. **Enfermedades del café. La maya o hilo blanco de las raíces.** [Coffee diseases. White thread disease of the roots.] Bol. Camara Agric. Costa Rica 2: 193-201. 1922.—Coffee root disease has been serious in Costa Rica for many years. The fungi concerned have not been definitely determined. Carbon bisulphide and other treatments were found ineffective or so expensive as to be prohibitive. Lime-sulphur was finally tried and found effective when the solution was applied about the roots.—John A. Stevenson.

655. PEKLO, YAR. **Na nové cestě.** [On the new path.] Ochrana Rostlin 1: 7-9. 1921.—*Puccinia glumarum* is doing great damage to wheat. Ordinarily it reduces the crop by almost 20 per cent. In 1916 the reduction on the large estates was as high as 35 per cent, and on the peasant farms even 50 per cent. Breeding of resistant varieties is the only means of controlling this disease. It was found that the squarehead varieties are resistant but are too late for Czecho-slovakia. The author succeeded in isolating some varieties from the crosses between the domestic varieties and those from Svalie and Slovakia, which show more resistance to *P. glumarum*. A review of the literature on breeding of resistant varieties is given.—E. Baudyš.

656. PRITCHARD, F. J., and W. S. PORTE. **Isaria rot of tomato fruits.** Phytopathology 12: 167-172. Pl. 12, fig. 1. 1922.—A rot of tomato fruits, not previously described, has been found in the experimental grounds at Arlington, Virginia, and at Washington, D. C., during 1919, 1920, and 1921. This rot was produced by a fungus which is described as *Isaria clonostachoides* n. sp. The fungus was grown upon various media and the chief characteristics of its growth recorded. Inoculations were made on both wounded and sound tomato fruits of various ages. Some infections were produced in all trials; but the percentage of infection was somewhat higher in wounded than in sound fruits. Very young and also ripe fruits were more readily infected and rotted faster than large green fruits. The fungus is not parasitic upon the leaves and stems of the tomato plant.—B. B. Higgins.

657. SALMON, E. S., and E. HORTON. **Lime-sulphur and calcium caseinate as a fungicide.** Jour. Ministry Agric. Great Britain 28: 995-999. 1922.—By tests conducted in the greenhouse it was determined that lime-sulphur at a strength of 1.003 sp. gr. (1 gallon of the concentrated solution (1.30 sp. gr.) to 99 parts of water), and containing 0.16 per cent of polysulphide sulphur, is lethal for the "powdery" conidial stage of the hop mildew (*Sphaerotheca Humuli* (DC.) Burr.) when the lime-sulphur is used with calcium caseinate in order to secure complete wetting of the fungus.—M. B. McKay.

658. SALMON, E. S., and H. WORMALD. Hop "canker" or "growing off." Jour. Ministry Agric. Great Britain 29: 354-359. 1 pl. 1922.—A disease of hops caused by *Fusoma parasiticum* is described in which typically 1 or more of the vines in a hill are killed by a cankering or eating away of the tissues at point of attachment to the rootstock. Generally the entire hill is not killed though cases have occurred where from 5 to 10 per cent of the hills in a garden have been completely killed.—Preventive measures listed are hard "cutting" or "dressing" of all hills in the affected part of the garden, grubbing up and destroying all dead hills, collecting and destroying all the cuttings from the hills in the affected part of the garden, and avoiding poor drainage.—M. B. McKay.

659. SMOLAK, YAR. Ochrana bramboru na poli. [Control of potato diseases in the field.] Ochrana Rostlin 1: 17-19. 1921.—Spraying with Bordeaux mixture is recommended for the control of diseases caused by *Phytophthora infestans* and *Alternaria Solani*, both of which are spread throughout the state.—E. Baudyš.

660. STRAŇÁK, FR. Fusariosa žita. [Snow mold of cereals.] Ochrana Rostlin 1: 5-7. Fig. 1-2. 1921.—*Fusarium* may produce so much damage to cereals that it does not pay to harvest them. The development of the disease depends largely on weather conditions. It appears in epidemic form during certain summers and in certain regions. An account of the development of the pathogene is given. In experiments to control the disease fusariol and uspulum were mainly tested, the latter giving the better results.—E. Baudyš.

661. STRAŇÁK, FR. Rakovina bramboru. [Potato canker.] Ochrana Rostlin 1: 46-48. 1921.—The author gives the history of the appearance and world distribution of this disease. *Synchytrium endobioticum* was brought to Czecho-Slovakia from Germany in 1916. A description of the life history, symptoms, and damage done by the disease is given. In Czecho-Slovakia 91,434 hectares of soil are infected by the disease. Sluknovský County has been declared infected by the disease and is closed. In the infested soil, resistance of varieties is tested and it has been found that the most resistant varieties are Jubel, Roode Star I, Prefrent, Effect, Present, and Eigenheim.—E. Baudyš.

662. STUCKEY, H. P., and B. B. HIGGINS. Spraying peaches. Georgia Agric. Exp. Sta. Bull. 135. 91-101. 1919.—The following diseases, with means of control, are discussed: scab (*Cladosporium carpophilum*), brown rot (*Sclerotinia fructigena*), leaf curl (*Erysia deformans*), and several insects, giving also spray formulas and applications.—T. H. McHatton.

663. TELLEZ, OLIVERIO. Una plaga en el estado de Jalisco. La "Pinta" o "Clavo" de la naranja y de la guayaba. [Anthracnose of orange and guava in Jalisco.] Rev. Agric. [Mexico] 6: 651-652. 2 fig. 1922.—*Gloeosporium Posidii* Delacr. causes anthracnose of the orange and guava. The use of Bordeaux mixture is recommended as a control measure.—John A. Stevenson.

664. TROST, JNO. F. Relation of the character of the endosperm to the susceptibility of dent corn to root rotting. U. S. Dept. Agric. Bull. 1062. 7 p., 2 pl. 1922.—Ears of seed corn of dent varieties characterized by starchy endosperm have been found to be infected with root-rot organisms more frequently than seed ears characterized by horny endosperm. In field tests the starchy seeds produce larger numbers of weaker plants which are more susceptible to root-rot.—J. T. Buchholz.

665. TROWBRIDGE, P. F. Report of the director, year ending June 30, 1921. North Dakota Agric. Exp. Sta. Bull. 159. 20-24. 1922.—Under "Biology," notes are given on black points of kernels, stem rust, scab, and "Helminthosporium blight," of wheat; on frost injury, wilt, and canker of flax; and on potato disease studies.—L. R. Waldron.

666. VIÉLWERTH, VL. O vlivu chemických moridel na mazlavou sněť pšenickou. [The influence of treatment with chemicals on stinking smut of wheat.] Československý Zemědělec 2: 285-287. 1921.—Chemicals used in the control of the disease caused by *Tilletia Tritici* are divided into 3 groups, on the basis of whether they contain (1) copper, (2) formaldehyde, or (3) mercury. Copper sulphate does not kill the spores but only reduces their percentage of germination. Formalin and sublimate, on the other hand, kill the spores.—E. Baudyš.

667. WHITEHEAD, T. Varieties of swedes resistant to finger-and-toe. Jour. Ministry Agric. Great Britain 29: 362-368. 1922.—Two selections of Danish swedes resistant to the finger-and-toe disease (*Plasmodiophora Brassicae*) were tested in comparison with some British varieties susceptible to the disease. The results obtained seem to show that the 2 Danish varieties resist club-root to a marked degree and, in addition, keep better and have a higher feeding value than the remainder of the varieties included in the trial.—M. B. McKay.

668. YORK, HARLAN H., and WALTER H. SNELL. Experiments in the infection of *Pinus Strobus* with *Cronartium ribicola* (a preliminary statement). Phytopathology 12: 148-150. 1922.—Successful inoculations, under known conditions of temperature and humidity, on seedlings of *Pinus Strobus* with sporidia from the leaves of cultivated *Ribes nigrum* are reported. With an average temperature of 65°F. and a relative humidity of 94 per cent, sporidia developed on *Ribes* leaves in 5-6 hours, and infection of the pine needles occurred in 12½ hours after inoculation with the sporidia.—B. B. Higgins.

DISEASES CAUSED BY BACTERIA

669. DOOLITTLE, S. P. Comparative susceptibility of European and American varieties of cucumbers to bacterial wilt. Phytopathology 12: 143-146. 1922.—In comparable plantings of American and European varieties of pickling cucumbers it was found that all of the European varieties were much more susceptible to bacterial wilt than the American varieties.—B. B. Higgins.

670. GIROLA, CARLOS D. Agallas de corona del duraznero. [Crown gall of peach.] Bol. Ministerio Agric. Nación [Argentina] 26: 257-259. 1 pl. 1921.—Crown gall (*Bacterium tumefaciens* Erw. Sm. & Town.) of peach and its control are discussed.—John A. Stevenson.

671. LEE, H. A. Relation of the age of citrus tissues to the susceptibility to citrus canker. Philippine Jour. Sci. 20: 331-341. Pl. 1-4. 1922.—Experiments are presented in which fruits of *Citrus sinensis*, *C. nobilis* var. *unshiu* and *C. maxima* were inoculated at graduated stages in their maturity, from standard cultures of the citrus canker organism, *Pseudomonas Citri* Hasse. The experiments, carried over a length of 2 years, show that the period of serious susceptibility from a commercial point of view is 54 days or less for the unshiu oranges, 105 days or thereabouts for the Washington navel orange, and more than 135 days for the grapefruit varieties. The results show a very definite decrease in susceptibility of citrus tissues, both fruit and foliage, as they approach maturity. This is of very great importance in control work.—E. D. Merrill.

672. LEE, H. A., and A. SHINO. Citrus canker control experiments in Japan. Philippine Jour. Sci. 20: 121-151. Pl. 1-4, fig. 1. 1922.—Experimental work on the prevention of citrus canker upon the Washington navel variety of sweet orange, *Citrus sinensis*, is described. The following results were obtained by these methods: Copper sprays without other treatment reduced the number of fruits affected with citrus canker to as low as 34, 37, and 46 per cent. Untreated plots had percentages of cankered fruits of 80, 86, 92, and 96 per cent. The cost of these spray applications for the season was from 32.4 to 33.7 Japanese sen per tree. Lime-sulphur without other treatment reduced canker, but not to such an extent as did the copper sprays. The applications of this spray for the season cost 31 Japanese sen per tree. Formalin solution (1 to 100) did not reduce the canker. On the contrary, the trees sprayed with formalin had a very slightly larger percentage of cankered fruits than did the controls. The cost of

formalin sprays for the season was 1 Japanese yen per tree, or 3 times the cost of any of the other sprays. Spraying with copper sprays, accompanied by a removal of the sources of infection before the period of canker activity, reduced the canker percentage on treated plats to 9.25, 6.5, and 18.5 per cent. The cost of such treatments was 92 sen for Bordeaux 4-4-50 mixture, 90 sen for neutral Bordeaux mixture, and 92 sen for Burgundy 3-3-50 mixture.—Data are presented to show that wind prevention in itself may reduce citrus-canker development from 50 to 60 per cent to 6, 20, and 37 per cent. The injury by citrus canker to the Washington navel orange is described in detail. It seems reasonable to conclude that, in countries where citrus canker is already widespread or universal, a feasible control may be obtained upon citrus fruits of the general susceptibility of the Washington navel.—*E. D. Merrill.*

673. McLEAN, F. T., and H. A. LEE. Pressures required to cause stomatal infections with the citrus-canker organism. *Philippine Jour. Sci.* 20: 309-321. *Fig. 1-2.* 1922.—A method is outlined for applying measurable pressure to *Citrus* leaves and determining by this means the pressures necessary to cause penetration of such tissues by water. Tests of the injection pressures of *Citrus* leaves gave the following results: The average pressure for Pernambuco grapefruit was 19.5 cm. of mercury; seedling East Indian pummelo, 19.6; Washington navel orange, 20.8; and Szinkom mandarin orange, 33.6. The average injection pressures of the above 4 varieties are directly proportional to their canker resistance, as shown by field observations. Leaves of Szinkom mandarin orange, a resistant variety of *Citrus*, and seedling grapefruit and pummelo trees, both very susceptible, were tested for their resistance to the entrance of canker organisms applied in water under pressure. Szinkom mandarin orange leaves were resistant to canker infection by immersion, and up to pressures of 10 cm. of the mercury column. With high pressures numerous cankers developed in leaves of this variety. Grapefruit and pummelo leaves developed canker readily by immersion without added pressure. The pressures necessary to cause canker infection were thus in agreement with the degree of observed field resistance of the sorts tested. The results obtained strongly substantiate the theory previously advanced that structural differences in the stomata constitute one cause for the differences in susceptibility of the mandarin orange and the grapefruit and pummelo varieties. In the mandarin orange apparently the structure of the stomata prevents the ingress of surface water; in the grapefruit the stomatal structure is such as to allow the ingress of surface water which thus affords a medium of entrance for the canker bacteria. The results definitely indicate that the resistance of the mandarin orange is due to mechanical structural differences.—*E. D. Merrill.*

674. PAINE, SYDNEY G., and MARGARET S. LACEY. Chocolate spot disease or streak disease of broad beans. *Jour. Ministry Agric. Great Britain* 29: 175-177. 1 pl. 1922.—The chocolate spot or streak disease of broad beans caused by *Bacillus Lathyri* occurred as a serious epidemic in many counties and was very general throughout a large part of England and Wales in 1920. The apparent spread of the disease seemed to suggest wind dispersal of the causative organism. The causal organism is carried on the seed of winter beans, and especially on those bored by the bean beetle, *Bruchus rufimanus*. In its attacks on the young pod this beetle may inoculate the plant at the time of egg-laying and the young larvae may infect the seed when they bore their way in.—Measures of control suggested are to dress the land well with potash, reject seed showing an excessive amount of boring by beetles, and sterilize the seed by soaking for 10 minutes in weak lysol or formalin or by dressing with one of the tar preparations supplied for the purpose.—*M. B. McKay.*

675. WELLES, COLIN G., and EMILIANO F. ROLDAN. Solanaceous wilt in the Philippine Islands. *Philippine Agric.* 10: 393-398. *Pl. 1-3.* 1922.—The authors report studies on *Bacterium Solanacearum* E. F. Smith which is known to cause serious disease of tomato, tobacco, and egg-plant in the Philippines. Egg-plants appear somewhat resistant and may be grown successfully if planted during the rainy season so that maturity will be reached early in December. A description of the disease on tomato, tobacco, egg-plant, and castor bean is given. *Chrysanthemum coronarium* is attacked by a similar, if not identical, organism.—*Sam F. Trelease.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

676. EYER, JOHN R. Notes on the etiology and specificity of the potato tip burn produced by *Empoasca mali* LeBaron. *Phytopathology* 12: 181-184. *Pl. 14, fig. 1.* 1922.—Continuing a study of the demonstrated relation of the potato leafhopper (*Empoasca mali* Le B.) to a certain form of the tip burn of potato (*Solanum tuberosum* L.) leaves, an attempt has been made to determine the nature and the transmissibility of the substance injected into the leaves by the leafhopper. Inocula were prepared by macerating either nymphs or the adult leafhoppers in sterile water or in 10-70 per cent alcohol. This extract was injected, with a small hypodermic needle, into the midrib of growing potato leaves. Into other leaves similar quantities of water or alcohol were injected to serve as checks. The leaves inoculated with leafhopper extract developed typical tip burn, while the checks remained healthy. The extract from nymphs was more virulent than that from adult insects. Extracts prepared from other species of sucking insects failed to produce tip burn. Direct sunlight was not necessary for the development of tip burn, though heavy shade retarded the development of the disease.—*B. B. Higgins.*

677. GOODEY, T. On the susceptibility of clover and some other legumes to stem-disease caused by the eelworm, *Tylenchus dipsaci*, syn. *Devastatix*, Kühn. *Jour. Agric. Sci.* 12: 20-30. *Pl. 1, fig. 1-2.* 1922.—After a brief review of the literature, the parasite and the disease are described. The term stem-disease corresponds to the German term *Stockkrankheit* and should be retained although the name stem-rot applied to the disease caused by *Sclerotinia trifoliorum* may be somewhat confusing. Symptoms of the 2 diseases are compared. Preliminary inoculation with single eggs containing well developed larvae showed that mature and sexually differentiated worms are developed in 24-30 days after inoculation. Other experiments showed that red clover is very susceptible to attack. For the main experiments, seed of 4 varieties of red clover, 2 of cow grass, 2 of alsike clover, and 5 of white clover were sown in pots in heavily infested soil. Seed of kidney vetch, sainfoin; lucerne (Provence), and trefoil were also used. After 37 days all seedlings were harvested and healthy and diseased plants preserved separately. Data were secured from this material on the percentage of infection, and by means of counts from infected plants an idea of the intensity of infection was obtained. The plants used were found to be separable into 4 groups: group 1, including the red clovers, Swedish cow grass, and kidney vetch, was very susceptible; group 2, including English cow grass and 2 varieties of alsike, was very much less susceptible; group 3, including sainfoin and 3 varieties of white clover, was only slightly susceptible; and group 4, including lucerne, trefoil, and Sutton's Mammoth white clover, was entirely resistant. Canadian red clover was found to be much more susceptible than other species of red clover. The author concludes that to avoid stem-disease it is advisable not to sow red clover, cow-grass, or Alsike clover, but rather trefoil, lucerne, or a large white clover.—*V. H. Young.*

678. WEISS, H. B., and E. WEST. Notes on the dodder gall weevil, *Smicronyx sculpticollis* Casey. *Ohio Jour. Sci.* 22: 63-65. *1 fig.* 1921.—Galls on *Cuscuta Cephalanthi* Eng. produced by the weevil are described.—*H. D. Hooker, Jr.*

INFECTIOUS CHLOROSIS (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

679. ANONYMOUS. Mosaic disease-susceptible and immune varieties. *Jour. Jamaica Agric. Soc.* 25: 427-429. 1921.—This is a discussion of cane varieties immune and susceptible to the mosaic disease, based on work carried out in Porto Rico with the variety Kavangire.—*John A. Sterenson.*

680. ARTSCHWAGER, E. Occurrence of phloem necrosis in leafroll tubers. *Phytopathology* 12: 193-194. 1922.—Potato (*Solanum tuberosum* L.) plants of long leafroll lineage have been observed to produce tubers and stolons which show severe phloem necrosis. When tubers showing only slight symptoms of necrosis were planted the necrotic tissue increased as the tubers began to sprout. It developed near the eyes from which sprouts were growing irre-

spective of the position of the eye on the tuber, showing that necrosis is linked with growth activity.—*B. B. Higgins.*

681. BARRUS, MORTIER F., and CHARLES C. CHUPP. **Yellow dwarf of potatoes.** *Phytopathology* 12: 123-132. *Pl. 7-8, fig. 1.* 1922.—A disease of Irish potatoes (*Solanum tuberosum*), thought to be new to science, has recently been recognized in several counties of New York State. The leaves of the diseased plants have a yellow color, and toward the tops of the plants the leaflets show a tendency to roll. The stems are stocky but decidedly dwarfed. When sectioned they show numerous brown specks in the cortical tissue, especially in the upper nodes. Such plants produce a few irregular tubers which are usually cracked. When sectioned the tubers also show the brown specks in the cortical tissues. The disease is apparently transmitted through the soil and also by some agency above the soil, but the cause of the disease and the exact method of its transmission have not been determined.—*B. B. Higgins.*

682. COOK, MEL. T. **The dissemination of peach yellows and little peach.** *Phytopathology* 12: 140-142. 1922.—It has been found that peach yellows and little peach may be transmitted to healthy trees by inserting a bud from a diseased tree, even though the bud may fail to grow. They may be transmitted also by inserting a piece of bark from a diseased tree; but attempts to infect healthy trees by injecting juice from diseased trees have failed. The length of the incubation period may be 1-4 years, depending upon the severity of the disease in the tree from which the bud was taken. A bud taken from an inoculated tree during the incubation period may transmit the disease. Trees from which buds are to be taken for nursery work should have been under previous observation for at least 4 years.—*B. B. Higgins.*

683. COTTON, A. D. **Potato leaf curl demonstrations.** *Jour. Ministry Agric. Great Britain* 28: 1019-1021. 1922.—Comparative demonstrations of the cropping qualities of healthy and leaf-curl or leaf-roll diseased seed potatoes were conducted in 1921 in 10 widely separated localities. The healthy seed came from a field free from disease. A 2nd lot of seed was from a field a few miles distant which was generally, though slightly, affected with leaf curl. The seed affected with leaf curl yielded on the average only about $\frac{1}{2}$ as much as healthy seed.—*M. B. McKay.*

684. FAWCETT, GEO. L. **Las primer as investigaciones sobre el mosaico en Java.** [The first investigations on mosaic in Java.] *Rev. Indust. Agric. Tucumán* 11: 121-123. 1920.—The author reviews the work of Kobus and Wilbrink-Ledeboer who first studied the mosaic disease of sugar cane in Java. The author's experiments confirm their conclusion that plants grown from true seed obtained from diseased plants are free from the disease. Their idea that the disease is merely a vegetative variation has of course been definitely disproved.—*John A. Stevenson.*

685. FAWCETT, GEO. L. **Notas sobre la extirpación del mosaico de la caña.** [Notes on the eradication of the cane mosaic.] *Rev. Indust. Agric. Tucumán* 11: 74-76. *Fig. 1-2.* 1920.—The author divides sugar cane varieties into 3 classes with respect to their behavior toward the mosaic disease: (1) immune varieties, represented by Kavangire; (2) resistant varieties, including a number of the Javan seedlings; (3) susceptible varieties. The native varieties of Tucuman fall in the last class although some are superior to the resistant types in sucrose and lack of fiber. In the experimental plots of the experiment station an attempt was made to combat the disease by roguing out all diseased stools. Although these plots were isolated from other cane nearly all stools showed the disease. Apparently there is no hope for the susceptible varieties.—*John A. Stevenson.*

686. HUNGERFORD, CHAS. W. **Leaf roll, mosaic and certain other related diseases in Idaho.** *Phytopathology* 12: 133-139. *Pl. 9.* 1922.—In Idaho both leaf roll and mosaic have gradually increased in severity and extent since first noted in 1919. Comparable plantings of potatoes from healthy and from diseased plants have shown that these diseases may cause

heavy loss in yield.—In "Russett dwarf," similar to certain types of mosaic, the diseased plants are much dwarfed and from a distance their yellowed leaves present a very rusty appearance. In more advanced stages the leaves drop off, beginning at the bottom of the plant. Dark brown streaks appear on the leaf petioles and on the lower part of the stems. The yield is reduced $\frac{1}{3}$ – $\frac{2}{3}$. The disease is infectious and is transmitted as is mosaic.—A condition known locally as "Calico" seems to be inherited but is not infectious and is not considered a serious malady.—*B. B. Higgins.*

687. PERRET, CL. Sur les maladies des pommes de terre. [Potato diseases.] Ann. Épiphyties 7: 304–314. 1921.—Germination of tubers on trays shows up spindle sprout ("filosite") but not phloem necrosis or mosaic. A nitrogenous fertilizer does not cure phloem necrosis and mosaic but it masks the symptoms. Experiments have demonstrated the prominent rôle played by sound tubers in potato production. The effect of nitrogenous fertilizers on the vegetative growth of the Andrea variety was very clear; that of a radio-active fertilizer was very slight but the crop was increased. Under the action of extra intensive manuring the plants grew luxuriantly. Nevertheless, leaf roll symptoms were visible at the end of the season on the Andrea variety, the yellow mosaic spots were very apparent on the Violette du Forez, and the number of dwarf plants with seed tubers preserved was considerable. The variety Violette du Forez which has existed in the province of the Loire for over 50 years has slowly lost a part of its characteristic stability, and the process of decline has been rather definite. The incurvation of the leaves does not occur, but one sees in the field numerous missing plants, a backward crop, and many dwarf plants with seed tubers preserved; also, plants with a single stem only, with the yellow spots on the leaves and with here and there some signs of leaf curling. This trouble is probably a leaf roll or mosaic degeneration. At altitudes of 850–1100 m. the regularity of the fields is greater than in the lower regions (650–850 m.). The method of keeping potatoes appears to exercise a certain influence on the process of degeneration.—In the varieties affected with phloem necrosis the author has followed the progress of the degeneration during the years 1918–1920. A table shows very clearly the progress of the leaf roll and the favorable effect of good meteorological conditions on the yields.—The important symptoms of phloem necrosis which accompany the considerable reduction in yield are as follows: (1) Incurving of the leaves appearing early and at the lower part of the plant. (2) Incurvations later becoming general in nearly all of the leaves. (3) Agglomerations of tubers at the base of the stalk. (4) Preservation of the seed tuber in the ground, even in moist seasons, in at least 30 per cent of cases. The preservation of the seed tuber is observed also in the varieties with mosaic, and in dwarf plants. The decline of strains of potatoes assumes 3 main forms in the Loire: (a) The phloem necrosis form, frequent in the varieties Institut de Beauvais, Merveille d'Amérique, and Bimel. (b) The form associated with mosaic and missing plants, the type which has been chiefly included under mosaic without definite correlation with spindling sprout ("filosite") and which has been observed in Violette de Paris and Saucisse de Paris. (c) Mixed forms participating in the 2 preceding; there may be the leaf roll symptoms, dwarf stalks, and sometimes missing plants, as observed in Anglaise, and Fin de Siècle. Preservation of the seed tubers in the ground occurs in these 3 forms. The size of the crop and percentage of dry matter are diminished and the content in nitrogenous material is increased in the tubers.—*Phytophthora infestans* is not to be considered as a cause of degeneration.—The progeny of a plant with phloem necrosis shows leaf roll symptoms. A plant appearing healthy, but growing among other plants with leaf roll, may produce either sound or leaf roll progeny. There are no immune plants; those appearing immune are only accidentally non-infected. Growing of seed potatoes in other localities exercises a beneficial action on the yields and has a rejuvenating effect on the variety; but such methods do not eradicate mosaic, leaf roll, or spindling sprout ("filosite").—The author considers the measures necessary to protect French strains from degeneration diseases.—*E. Fôex.*

688. POOLE, R. F. Celery mosaic. Phytopathology 12: 151–154. Pl. 10, fig. 1. 1922.—During the season of 1921 a stunted and malformed condition of celery (*Apium graveolens*) was noted in 2 localities of New Jersey. This condition was found to be due to an infectious

mosaic which could be transferred from diseased to healthy plants by means of aphids (*Myzus persicae*). There were some indications that the celery plants became infected from mosaic in nearby tomato plants.—*B. B. Higgins*.

NON-PARASITIC DISEASES

689. ADAMS, J. F. Observations on frost protection and drought spot of apple. *Phytopathology* 12: 184-187. *Fig. 1*. 1922.—During the spring of 1921 late frost so injured the apple crop in Delaware that the yield for the state was reduced to 12 per cent of normal. However, 1 orchard was noted in which a normal yield was produced. Inquiry brought out the fact that some charcoal furnaces on the windward side of this orchard produced a smudge that undoubtedly protected the fruit from frost. During the summer the York Imperial apples in this orchard showed considerable drought spot. Counts made Aug. 1 showed 5 per cent injury; but a month later the more seriously affected fruits had dropped so that counts at that time showed only about 1 per cent of diseased fruit. A long dry spell during early summer together with unfavorable soil conditions apparently brought on the disease.—*B. B. Higgins*.

690. FIROR, J. W. Winter killing of fruit and nut trees. *Georgia State Coll. Agric. Circ.* 60. 4 p., 1 fig. 1920.—This reprint contains a general discussion of winter injury on fruit trees in Georgia with suggestions concerning maturing of trees before frost, mounding in late fall, and using whitewash and cover crops for protection.—*T. H. McHatten*.

691. GLEISBERG, W. Hagelschäden bei Bohnen-Keimpflanzen. [Injury to bean seedlings by hail.] *Illustr. Landw. Zeitg.* 42: 184-185. *Fig. 1-2*. 1922.—By experiment it is shown that bean seedlings may be deprived of various important organs such as the cotyledons or the plumule and still bear as good crops as normal plants. The details attending the recovery of the plants are given.—*John W. Roberts*.

692. LINSBAUER, L. Ueber eine Stoffwechselerkrankung an Apfelfrüchten und deren Heilung. [A physiological disease of apple fruits, and its cure.] *Zeitschr. Pflanzenkr.* 32: 1-17. 1922.—The author describes a peculiar malformation of apples of the variety Edelrot from the Southern Tyrol. The typical fruit of this variety averages 60-65 mm. by 60-64 mm., and the weight varies between 110 and 114 gm. Larger specimens are very regularly spherical-oblong; smaller specimens are blunt cone-shaped towards the stem end. Around the stem itself the fruits are flattened. The curve of the surface is uniform, tapering toward the calyx end. The skin is finely glossy and light greenish-yellow, later becoming yellowish-white like wax.—The fruits from affected trees are on the average smaller and inferior in shape. The average weight of an abnormal apple was 42 gm. as compared with 106 gm. for the normal fruit. Affected apples often appear laterally undeveloped toward the calyx end, becoming more pointed than typical ones. The skin of the diseased fruit shows, usually toward the calyx end, shiny, chestnut-brown, sharply defined areas which become confluent and in consequence of which there is a one-sided growth. At times the smaller fruits are covered by a brown, scabby crust with cracks, which no doubt contributes to the deficiency of sap within the fruits.—With the exception of the fruits, affected trees appear normal. The trees are well cared for, especially as regards spraying, etc. The soil is a sandy loam 40-80 cm. in depth underlain by "Bachschotter" (gravel?), and is described as very good. Every 8-14 days the trees are watered. In consequence of early applications of night-soil the trees have made a luxuriant growth, and the owner is inclined to attribute to this manuring process the development of the malformed fruit.—Apparently the most vigorous trees suffered most, while weak trees never developed the trouble.—The author determined the losses due to transpiration during a 24-hour period and found that the loss from transpiration was less in normal than in abnormal fruits. Transpiration, however, was greater in the larger specimens of both normal and abnormal fruits. Chemical analysis revealed a higher water content in the sound fruits, together with a corresponding decrease in dry substance. The sound fruits were higher in nitrogen compounds. The disease in some instances caused a 50 per cent loss in the crop.—

Unfavorable composition of the mineral nutrients available to the trees is suggested as possibly responsible for this malformation of the fruits. Fertilizer experiments conducted on hay in the affected orchards showed beneficial results from acid phosphate, which gave almost double the return.—Experiments were now tried to test the effect of suitable fertilizers on the development of the fruits. Fifteen affected trees were divided into 3 plots. The 1st received no treatment (check); the 2nd, potash and lime; the 3rd, basic slag and 18 per cent superphosphate. At the end of the experiment the trees in plot 1 were freely affected. The potash and lime plot showed no change for the better. The trees receiving acid phosphate, however, showed a remarkable improvement, and in the bearing trees no sign of the trouble was noted. In the abnormal fruits the nitrogen content sinks to a minimum, but this content becomes increased after the potash-lime application. In the fruits from trees treated with phosphoric acid, however, the nitrogen content was equal to that of the normal fruits.—The conspicuous effect of phosphoric acid may be regarded as a fact, but this does not explain the remarkable results. It would seem premature to attribute to the phosphoric acid a specific rôle in the development of the fruit. That the phosphoric acid in the soil had diminished owing to the practice of overfertilizing with nitrogen for many years is apparent from the experiments with the orchard hay. It is argued that the supply of phosphoric acid has increased the capacity of the trees to make use of potash. Apparently it has really been the potash to which should be credited the normal development of the fruits. The author states that further careful experiments and analyses would no doubt throw considerable additional light on the subject.—H. T. Güssow.

DISEASES OF UNKNOWN CAUSE

693. BROWN, J. G., and FREDERICK GIBSON. Some observations on alfalfa girdle. *Phytopathology* 12: 188-190. *Pl. 15*. 1922.—A serious disease of alfalfa (*Medicago sativa* L.) known as "Girdle" has been under observation in the southwestern part of the U. S. A. since 1912, but the cause of the malady has never been determined. Recently, similar girdles have been observed on several other species of plants in this region. In 1 case a scale insect (*Coccus hesperidum* L.) was found associated with the girdle. It seems probable that the scale is connected with the disease as a carrier of the causal organism, or otherwise.—B. B. Higgins.

694. CHANDLER, S. E. The brown bast disease of the Para rubber-tree. *Nature* 109: 357-360. 1922.—A review of 6 recent publications is made.—O. A. Steens.

695. FAWCETT, GEO. L. Notas preliminares sobre una enfermedad del tabaco. [Preliminary notes on a tobacco disease.] *Rev. Indust. Agric. Tucuman* 12: 5-17. *Fig. 1-14*. 1921.—The most serious disease of tobacco in Tucuman province of Argentina is that known as "Corcova," a term descriptive of the form taken by diseased plants. Black lines somewhat resembling insect galleries develop on both surfaces of the leaves and on the stems; these areas may coalesce. Affected portions of leaves become yellow in color, and finally wither and droop. Partial recovery is sometimes noted during periods of dry weather. The continued growth of unaffected portions of leaves causes a characteristic curling or distortion. Insects are not responsible nor has it been possible to connect fungi with the disease as causative agents. Bacteria found in connection with the lesions of advanced cases failed to reproduce the disease. Certain varieties (Turco and Criollo in particular) are less subject to the disease than others. Early plantings show less of the disease than late plantings. Spraying with Bordeaux or sulphur compounds gave uniformly negative results.—John A. Stevenson.

696. GIRARDI, J. Durazneros. Manchas en las frutas. [Fruit spot of peach.] *Defensa Agric. [Uruguay]* 3: 55-56. 1922.—A fruit rot and leaf spot (cause not determined) has attacked peaches. Control measures are suggested.—John A. Stevenson.

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

697. BAUDYŠ, E. Význam ochrany rostlin pro zemědělství. [Importance of plant disease control for agriculture.] *Ochrana Rostlin* 1: 3-5. 1921.—Crop production is now $\frac{1}{4}$ of

that before the war. The reasons for this state of affairs are the lack of some of the mineral nutrients, mainly calcium, phosphorus, and potassium, and the inferior human force. Lack of mineral nutrients favors the spread of some diseases. The unusual spread of rust (*Puccinia graminis*) is attributed to the lack of calcium and phosphorus.—The most destructive disease of cereals is that caused by *Fusarium nivale*. Detailed estimates show that this disease causes damage to the extent of about 40 per cent. It can be controlled by sublimate, uspulum, or by breeding resistant varieties. The author observed that not all varieties are equally susceptible to this disease. Take-all disease, caused by *Ophiobolus* and *Leptosphaeria harpotrichoides*, was scarcely known before the war; now it reduces the crop by about 5–10 per cent. The spread of this disease is attributed to late plowing of the stubble field. *Helminthosporium* may reduce the crop of oats and barley by about 30 per cent. Smut reduces the crop of wheat and of oats each by about 10 per cent. Corn smut reduces that crop by 15 per cent. About 10 per cent of the potato crop is destroyed by black leg, and the damage done by all potato diseases is about 30 per cent. The conclusion is drawn from these data that disease control is very important for agriculture.—*E. Baudyš.*

698. BRAUN, HARRY. Effect of delayed planting on germination of seed wheat treated with formalin. *Phytopathology* 12: 173–180. *Pl. 13, fig. 1–3.* 1922.—A comparison of the injury produced by the ordinary formalin treatment and by the pre-soak formalin treatment was made with 5 varieties of wheat. One set of a quart of each variety was dipped for 30 minutes in a solution of 1 part formaldehyde to 320 parts water, drained, and covered for 1 hour. Another set was treated in the same way except that the seed were dipped 10 minutes in water, drained, and covered 5½ hours before dipping into the formalin solution. All were then spread out to dry. At the end of 24 hours and again at the end of a week 300 seed were counted from each lot and planted in pots in the greenhouse along with a similar lot of untreated seed. There was some injury to the seed treated by the ordinary formalin method and the injury increased in most cases when the seed were held for 1 week. With seed treated by the pre-soak method there was no injury. In most cases there was an increase in the per cent of germination and a marked stimulation of growth.—*B. B. Higgins.*

699. BROWNING, C. H., J. B. COHEN, and R. GULBRANSEN. The antiseptic properties of cyanine dyes. *British Med. Jour.* 3196. 514–515. 1922.—The results of recent tests on the cyanine group of dyes concerning their antiseptic properties show: (1) certain of the cyanine dyes are extremely potent antiseptics—for example, sensitol red for staphylococci in watery medium; (2) selective antiseptic action as between staphylococcus and *B. coli* is exhibited to a higher degree by certain of these dyes—for example, sensitol red—than by any other compound hitherto investigated, the ratios of the sterilizing concentrations probably being greater than 2,000 to 1 (with crystal violet the ratio is 500 to 1); and (3) sensitol green is the most active of these dyes both in serum and watery medium for *B. coli*. Also, in the case of *B. coli* the antiseptic action in serum is more intense than in water medium.—[*Through Public Health Engineering Abstracts.*]

700. CHASE, W. W. The principal parasites of the peach. *Georgia State Bd. Entomol. Bull.* 57. 48 p., 10 pl. 1920.—Besides a discussion of several insects life histories are given and methods of control for brown rot (*Sclerotinia fructigena* Scleroet.), crown gall (*Pseudomonas tumefaciens*, E. F. S. & Town.), peach scab (*Cladosporium carpophyllum*), peach leaf curl (*Eoasacus deformans* (B) Fuckel). The bulletin concludes with a discussion of concentrated lime-sulphur and the management of peach orchards.—*T. H. McHatton.*

701. DIX, WALTER. Beizapparate. [Apparatus for the treatment of seed.] *Illus. Landw. Zeitg.* 42: 84–86. *Fig. 93–96.* 1922.—Detailed descriptions, with drawings, are given of elaborate apparatus for use in the fungicidal treatment of seed grains.—*John W. Roberts.*

702. GIROLA, CARLOS D. Sobre algunas enfermedades de la papa. [Concerning some potato diseases.] *Bol. Ministerio Agric. Nación [Argentina]* 26: 260–264. 2 fig. 1921.—Brief descriptions are given of rosette (*Corticium vagum* B. & Curt. var. *Solani* Burt.) and scab (*Actinomyces scabies* Thaxter). Control measures are outlined.—*John A. Stevenson.*

703. LEK, H. A. A., VAN DER. Over den invloed van enting en bastaardeering op de vatbaarheid voor parasitaire aantastingen. [The influence of grafting and hybridisation on the susceptibility to diseases.] Tijdschr. Plantenz. 27: 124-128. 1921; 28: 1-14, 37-45, 97-103. 1922.—The writer points out first the difference between grafting and hybridisation; that in the 2nd case a new set of characters is being formed while in the 1st the existing characters are only modified more or less through the surrounding environment. After giving numerous examples of such modifications and of the relation between the stock and scion he points out the influence of the understem on the longevity of the grafted trees; that this is greatly decreased and that the period of degeneration and decline in vigor, during which the plants become susceptible to diseases, comes much earlier than in the case of ungrafted trees. In some cases the modifications brought about through grafting may be a thickening of the cuticle and changing of the hairiness; in other cases the chemical composition of both the plants (components) is materially changed. All this can influence the resistance of the plants to diseases. The nature of immunity of plants to diseases is also briefly discussed and the importance of the changes in the periodicity of plants as affecting their resistance to diseases is pointed out. The question of chimeras is then discussed and the somewhat unsatisfactory results obtained with plant chimeras in connection with obtaining disease resistant varieties are treated. The latter fail to throw any light on the possible changes in the physiological properties of the plants through the mutual influence of the components, as has been noticed on grafted plants, which may play some rôle in increasing the resistance to diseases, be this real or only apparent. The writer shows through numerous examples that the stem and the scion do not change each other's resistance to diseases and emphasizes the importance of selection of stocks resistant to root diseases and insects, which he thinks will play a considerable rôle in the propagation of cultivated woody plants.—D. Atanasoff.

704. McHATTON, T. H., and J. W. FIOR. Spray calendar for Georgia. Georgia State Coll. Agric. Bull. 220. 12 p., 3 fig. 1920.—Spray schedules and formulas for fruits and vegetables are given.—T. H. McHatton.

705. MONTEMARTINI, LUIGI. L'applicazione degli articoli 6 e 7 della Convenzione internazionale di Roma 4 marzo 1914 contro le malattie delle piante. [The application of articles 6 and 7 of the international convention of Rome, March 4, 1914, against the diseases of plants.] Riv. Patol. Veg. 12: 1-6. 1922.—The difficulties of an effective inspection at ports of entry are discussed together with the need of a better and more complete organization of internal plant inspection service.—F. M. Blodgett.

706. MOREL, A., et A. ROCHALK. Action microbicide par contact de quelques essences végétales à l'état liquide. [Bactericidal action of certain plant essences in liquid state.] Compt. Rend. Soc. Biol. 86: 933-934. 1922.—The essences of thyme, citron, juniper, and mint were found to possess bactericidal action on meningococci, staphylococci, diphtheria bacilli, and Eberth's bacillus.—S. Morgulis.

707. REINKING, OTTO A. Citrus diseases of the Philippines, Southern China, Indo-China, and Siam. Philippine Agric. 9: 121-179. Pl. 1-14. 1921.—The paper is divided into 6 sections, 1 for each region, 1 for control measures, and a summary compiled on the basis of the hosts. A description of the diseases, a discussion of the causal organisms, and suggestions regarding control measures are given. The study was made in collaboration with the U. S. Bureau of Plant Industry, and involved considerations of importance in connection with shipments of citrus varieties to the U. S. A. The following list gives the organisms associated with Citrus, many of these organisms being pathogenic: *Aleurocanthus citripertus* Q. & B., *Aschersonia alcyonidis* Webb., *A. sclerotoides* P. Henn., *Aspidiotus cocotiphagus* Marlatt, *Auricularia polytricha* Sacc., *Chrysomphalus aurantii* Mask., *C. aonidium* L., *C. dictyospermi* Morg., *Cladosporium Citri* Massee, *C. herbarum* (Pers.) Link, *Coccus hesperidum* L., *C. mangiferae* Green, *C. viridis* Green, *Colletotrichum gloeosporioides* Penzig., *Corticium salmonicolor* B. & Br., *Crinipellis galeatus* Pat., *Cyathus Montagnei* Tul., *Cystospora aberrans* Sacc.,

Daldinia concentrica Cas. & de Not., *Diaporthe citrincola* Rehm, *Diplodia Aurantii* Catt., *Dolichoderus*, *Duportella tristiuscula* Pat., *Eutypa heteracantha* Sacc., *Eutypella citricola* Speg., *Fiorinia theae* Green, *Fomes applanatus* Pers., *Ganoderma australe* Pat., *Gloeosporium intermedium* Sacc., *Heterochaete tenuicula* Pat., *Hypoxyton atropurpureum* Fr., *H. serpens* (Pers.) Fr., *Lepido saphes beckii* Newm., *L. gloverii* Pack., *Loranthus ferrugineus* Roxb., *L. parasiticus* (L.) Merr., *L. pentandrus* L., *L. philippensis* Cham. & Schlecht, *Massarina raimundoi* Rehm, *Meliola citricola* Syd., *Microcera coccophila* Desm., *Mucor*, *Myriangium duriae* Mont., *Nectria episphaeria* (Tode.) Fr., *Nummularia citrincola* Rehm, *Oecophylla smaragdina* Far., *Ozonium auricornum* Lk., *Parlatoria brasiliensis* n. sp. Ms., *P. pergandii* Comst., *P. proteus* Curt., *P. sziphus* Lucas, *Penicillium*, *Peroneutypa heteracantha* Sacc., *Pheidologeton*, *Phoma*, *Phyllosticta citrella* Stainton, *Phyllosticta circumsepta* Sacc., *Phytophthora*, *Polyporus caryophylla* Racib., *P. hirsutus* Fr., *P. Rickii* Pat. var. *philippinensis* Pat., *Polystictus flavus* Jungh., *Pseudonidia trilobiformis* Green, *Pseudomonas Citri* Hasse, *Pulvinaria*, *Rhizoctonia*, *Rhytidopeziza rufula* Bres., *Saissetia*, *Schizophyllum commune* Fr., *Sclerotium*, *Septobasidium albidum* Pat., *S. carbonaceum* Pat., *S. leucostemum* Pat., *S. Reinkingii* Pat., *Terres*, *Traversoua dothiorelloides* Sacc. & Syd., *Trybliella mindanaensis* P. Henn., *Valsaria Citri* Rehm, *Xylaria castorla* Berk., *Zignoella nobilis* Rehm.—S. F. Trelease.

708. REINKING, OTTO A. Notes on diseases of economic plants in Indo-China and Siam, Philippine Agric. 9: 181-183. 1921.—A host index is given of 50 diseases for plants other than citrus. The following are listed among the pathogens: *Aithaloderma clavatisporium* Syd., *Cercospora batatae* Zimm., *Cercospora Henningsii* Allesch., *C. Nicotianae* Ell. & Ev., *C. vaginiae* Kr., *Cercosporina ricinella* (Sacc. & Berl.) Speg., *Dictyothyriella mucosa* Syd., *Hemileia vastatrix* B. & Br., *Macrophoma Musae* (Cke.) Berl. & Vogl., *Meliola mangifera* Earle, *Mycosphaerella gossypina* (Cke.) Atk., *Pestalozzia palmarum* Cke. & Grev., *Phytophthora faberi* Maubl., *Pseudoperonospora cubensis* (B. & C.) Rost., *Puccinia longicornis* Pat. & Hor., *Sclerospora*, *Sclerotium*, *Uredo Fici* Cast.—Sam F. Trelease.

709. ROSAM, V. O ochraně porostu proti chorobám a škudcům. [Control of plant diseases and insects.] Ochrana Rostlin 1: 2-3. 1921.—The author discusses the importance of control of plant diseases and insects for agriculture. The damage done by the plant diseases is greater than that done by the animal parasites. The present organization of phytopathological work is not sufficient. The suggestion is made to provide a law on the control of plant diseases, to organize work in the control, and to establish phytopathological stations. The propaganda should be conducted by means of leaflets, lectures, practical demonstrations, and moving pictures. Money could be obtained by taxing seed producers and plant breeders.—E. Baudys.

710. SCHOEVERS, T. A. C. Ziekten en beschadigingen van tomaten. [Diseases and injuries of tomatoes.] Tijdschr. Plantenz. 28: 67-93. Pl. 1-4. 1922. [Also in Verslag en Mededeel. Plantenziektenk. Dienst Wagenigen 26. 28 p. 1922.]—The following diseases and injuries of the tomato plant observed in Holland and remedies against them are briefly described: wire worm, *Oniscus*, *Verticillium albo-atrum*, *Rhizoctonia*, canker (*Diplodia* (*Didymella*) *Lycopersici*), *Sclerotinia libertiana*, fasciation, leaf-roll, soil sickness, *Heterodera radicola*, stripe disease (*Bacillus Lathyri*), *Cladosporium fulvum*, *Phytophthora infestans*, sunburn, mosaic, curl, hollow stem, *Aleurodes vaporariorum*, *Tetranychus*, aphids, blossom end-rot (*Phytobacter Lycopersicum*), uneven ripening, fruit splitting, hollow fruit. General measures for avoiding tomato diseases are discussed and 2 keys are given for the determination of the above named diseases.—D. Atanasoff.

711. STRANG, R. B. Diseases of the swede crop in Cumberland and Westmorland in 1921. Jour. Ministry Agric. Great Britain 28: 1093-1096. 1922.—Damage to swedes from 4 diseases, powdery mildew, club root, dry rot due to *Phoma napobrassicae*, and bacterial rot due to *Bacillus carototeorus*—is mentioned.—M. B. McKay.

712. TURNER, W. F. Spray schedule for Georgia peach season 1922. Georgia State Bd. Entomol. Circ. 36. 4 p. 1922.—Time of application and mixture for both dust and liquid sprays are detailed.—T. H. McHatten.

713. WESTERDIJK, JOHANNA. Passports for plants. Gard. Chron. 71: 224, 246. 1922.—An address at the International Professional Horticultural Conference at the Hague, Apr. 21, 1922, considers present knowledge of fungous and bacterial plant diseases and the danger of their spreading to countries not yet infected. Numerous examples from past experience are given.—*P. L. Ricker.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 3, 95, 99, 136, 144, 276, 279, 335, 348, 407, 454, 460, 473, 534, 591, 594, 706, 901, 923)

714. ABE, K., and I. SAITO. Active principle of Korean ginseng. Japan Med. World 2: 166. 1922.—The authors found that the substance in ginseng which has inhibitory action on blood sugar is not extracted by petroleum ether or ether, but by pure alcohol. This active principle of ginseng is said to be a glucosid.—[*Through Jour. Amer. Med. Assoc.*]

715. AMBERGER, KARL. Nachweis fremder Stärke im Getreidemehl. [Identification of foreign starches in cereal flours.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 181-182. 1922.—Starches are divided into 2 groups according as they are stable to, or dissolved by, diastase at a given temperature (58-59°C., never over 60°C.). Impure preparations of diastase have caused difficulty. Starches of wheat, rye, barley, and oats are destroyed, while those of corn (*Zea mays*), potatoes, beans, and rice are not. The latter may thus be concentrated for microscopic determination when present in small quantities.—*E. E. Stanford.*

716. BAUMANN, K., und J. KUHLMANN. Ermittlung des Zucker- und Fettzusatzes in Hefebackwaren. [Determination of the addition of sugars and fats in bakery products containing yeast.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 225-232. 1921.

717. BOSMAN, LOUIS PIERRE. Castelin, a new glucoside from *Castela Nicholsoni*. Jour. Chem. Soc. [London] 121: 969-972. 1922.—A glucoside, to which the name castelin was assigned, was prepared from the herb *Castela Nicholsoni*, a member of the *Simarubaceae*. On acid hydrolysis of castelin, crystalline castelagenin was obtained. A bitter principle is also reported to have been found in the bark of *Simaruba amara*.—*F. E. Denny.*

718. BOYER, G. Sur quelques empoisonnements par les champignons. [Mushroom poisoning.] Bull. Trimest. Soc. Mycol. France 37: 134-138. 1921.—Seven cases of mushroom poisoning are reported.—*D. S. Welch.*

719. FEDELI, CARLE. Ricerche sperimentali sull'azione del polline sul cuore degli animali. [Experimental work on the action of pollen on the hearts of animals.] Atti R. Accad. Lincei Roma Rend. Cl. Sci. Fis. Mat. e Nat. 31¹: 390-391. 1922.

720. GARCIA, F., and R. GUEVARA. Pharmacodynamics of *Datura alba*. Philippine Jour. Sci. 20: 599-609. Pl. 1. 1922.—The alkaloidal content of the seed is 0.5 per cent.—*E. D. Merrill.*

721. GHOSE, MANMATHA N. Further notes on the effect of certain climatic conditions on the cyanogenesis of jowar (*Andropogon sorghum*). Agric. Jour. India 16: 381-387. 1921.—At Sabour, in Bihar and Orissa, temperature and humidity have a great effect on the production and on the rate of disappearance of the cyanogenetic glucoside in this important Indian fodder crop. Even when growth has been retarded by unfavorable climatic conditions, the disappearance of the cyanide has been rapid under high temperatures. Under

low temperatures, the poison persisted for a long time and did not disappear by the addition of excessive moisture to the soil. Appreciable differences in the amount of hydrocyanic acid in plants collected early in the morning and late in the afternoon were also observed.—*A. Howard.*

722. GRIEBEL, C. Die Zellelemente des Maniokmehles. [Cell elements of tapioca flour.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 43: 169-171. Fig. 1. 1922.—A process is devised for use when the characteristic tapioca (*Manihot utilisima* or *M. palmata*) starch is unrecognizably swollen. Starch is removed by chloral hydrate, weak acid, or alkali. Groups of reticulate tracheids surrounded by porous thin-walled cells, and colorless, dotted stone-cells—usually thick-walled and often accompanied by crystal cells—are described and figured as characteristic. Other cell elements are briefly described and figured, as is also the cross-section of the manioc root.—*E. E. Stanford.*

723. GRIEBEL, C. Krystallinische Kalkabscheidungen in pflanzlichen Objekten durch Einwirkung alkalischer Reagenzien. [Crystalline precipitations of calcium salts in plant tissues by means of alkaline reagents.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 172-173. Fig. 1-2. 1922.—Sphaero-crystals of calcium carbonate form in cherry (*Cerasus vulgaris*) leaves and some other leaves when these are treated with Javelle's solution. Calcium carbonate also separates in crystalline form from flours when treated with alkali.—*E. E. Stanford.*

724. J[ATUL], P. A. Iš Musū Botanikos Dr. J. B-s. [From our botanist Dr. J. B.] Želmenija 1: 47-48. 1921; 2: 63-64, 79-80. 1922.—Brief notes are given from the Apszvieta by Jonas Basanavičius.—*C. W. Dodge.*

725. PENFOLD, ARTHUR RAMON. A critical examination of the aromatic aldehydes occurring in certain Eucalyptus oils. Jour. Chem. Soc. [London] 121: 266-269. 1922.—Aromatic aldehydes were separated in pure condition from essential oils obtained from the leaves and terminal branchlets of *Eucalyptus hemiphloia* and *E. salubris*.—*F. E. Denny.*

726. SIMONSEN, JOHN LIONEL, and MADYAR GOPAL RAU. The essential oil from *Blumea Malcomii*. Jour. Chem. Soc. [London] 121: 876-883. 1922.—*Blumea Malcomii*, a small woolly-stemmed herb growing in the western part of the Deccan plateau, yielded on distillation an essential oil resembling caraway-seed oil in odor. The young plants gave the highest yield, about 0.25 per cent of the fresh green tissue. The chemical constituents of the oil were isolated and identified.—*F. E. Denny.*

727. SPAGAZZINI, CARLOS. Plantas venenosos para los ganados. [Plants poisonous to stock.] Rev. Soc. Rural Cordoba [Argentina] 21: 5766-5774. 1921.—The author has found that many popular opinions concerning poisonous plants are wrong. He divides Argentine plants into 3 groups with respect to their poisonous properties. The 1st includes those always poisonous, either entirely or in certain organs, including *Nerium* and *Datura* sp.; the 2nd, those that are occasionally poisonous under certain conditions, such as *Sorghum*, *Zea mays*, and *Solanum tuberosum*. The 3rd group includes those found to be always innocuous.—*John A. Stevenson.*

728. VOGR, E. Nachweis und Bestimmung von Streckmitteln in Mehl und Brot. [Demonstration and estimation of adulteration in flour and bread.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 145-173. 1921.—The author discusses microscopic and chemical studies of the following adulterations: barley-meal, corn-meal, prepared oatmeal, and various potato products. Microscopic work was based on the form and size of starch grains, altered by the baking process, and on the occurrence of natural impurities of the various substances. The diagnosis was aided by differential staining with a weak solution of Congo red in India ink. Diagnosis of potato materials is hindered by extensive alterations of cell-contents. Micro-

scopic quantitative determinations are impracticable. Chemical diagnosis depends upon the "characteristic alkalinity" of the ash. By combined microscopic and chemical means approximately quantitative results may be obtained in some cases.—*E. E. Stanford.*

729. WILCZEK, E. *Note sur les impuretés du cacao.* [Remarks upon the impurities of cacao.] *Schweiz. Apoth. Zeitg.* 59: 120-126. 1921.—This article deals with the impurities (foreign fruits and seed) found in cacao at the time of sorting. Accidental admixture during the drying process and in the great marts of the producing countries is largely blamed. A list is given of the various impurities identified together with the geographical distribution of the mother plant and the source of the cacaos. The impurities are classified by the author as either "caracteristiques," indicating the origin of the cacao, or as "ubiquites," in which it is difficult to form any opinion of origin. Among the former are mentioned *Elaeis guineensis*, *Cocos nucifera*, *Cola vera*, etc., for the Kamerun, and *Cocos* sp., *Euterpe oleracea*, *Phytelphas macrocarpa*, *Bertholletia excelsa*, etc., for tropical America. There is much work to be done on the "ubiquites" group.—*H. W. Youngken.*

730. WOHACK, FRANZ. *Mikroanalytische Verfahren in der Nahrungsmitteluntersuchung.* [Microanalytical methods in food investigations.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 42: 290-299. 1921.—Determinations of vanillin and formic acid are chiefly concerned. Apparatus and methods are described and figured.—*E. E. Stanford.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 32, 33, 91, 94, 95, 119, 188, 191, 193, 195, 203, 208, 210, 215, 220, 226, 228, 285, 405, 410, 440, 443, 452, 460, 533, 537, 540, 673, 687, 691, 692, 698, 717, 721, 725, 726, 848, 849, 851, 852, 853, 856, 857, 863, 868, 873, 879)

GENERAL

731. BANCROFT, WILDER D. *Applied colloid chemistry.* 345 p. McGraw-Hill Book Co.: New York, 1921.—This treatment of the physical chemistry of colloids is intended as an introduction to proposed volumes on the specialized branches of the subject. It is, therefore, very general in its scope. Defining colloids as "any phase which is sufficiently finely divided," it draws material from a wide variety of sources, ranging from war gases and mining processes to eye-color; almost none, however, from biology. This material is treated deductively; a very extensive bibliography is given.—*Mildred L. Johnson.*

732. BERNARD, NOEL. *Principes de biologie végétale.* [Principles of plant biology.] 212 p., 18 fig. Felix Alcon: Paris, 1921.—This forms what is in effect the 2nd volume of a course in botany as presented by the author. The subject matter for the 1st volume of the course appeared in 1918 under the title *L'Evolution des Plantes*. The present volume is divided into 2 parts and is a brief treatise on general plant physiology. In the 1st part there are considered the physiology of the cell, physics of nutrition, metabolism, carbon assimilation, nitrogen nutrition, and external factors. The 2nd part deals with the morphology and physiology of the algae, fungi, and lichens. The concluding chapter is on plant immunity.—*H. C. Young.*

733. MAQUENNE, L. *Précis de physiologie végétale.* [Synopsis of plant physiology.] 172 p. Payot & Co.: Paris, 1922.—This is a brief presentation of physiological principles without illustrations or experiments. In Chapter I are considered such general topics as the composition of the air, the solubility of gases, diffusion, dialysis, osmosis, colloids, and enzymes. A chapter is devoted to each of the following: germination, growth and carbon

assimilation, nitrogen assimilation, the assimilation of mineral materials, respiration, water movements, migration of foods, and formation of the principal immediate products of nutrition.—*Grace E. Howard.*

734. PETTIBONE, C. J. V. *Physiological chemistry.* 328 p., *Illus.* C. V. Mosby Co.: St. Louis, Missouri. 1922.—This is a general text, including experiments for laboratory work. It is intended primarily for student use, but also for reference by physicians.—*B. M. Duggar.*

PROTOPLASM, MOTILITY

735. BOLTE, ELIZABETH. Über die Wirkung von Licht und Kohlensäure auf die Beweglichkeit grüner und farbloser Schwärmzellen. [On the effect of light and carbon dioxide on the motility of green and colorless swarmspores.] *Diss. Leipzig.* 37 p. 1920.

736. GRAY, J. The mechanism of ciliary movement. *Proc. Cambridge Phil. Soc.* 20: 352-359. 1921.—This is an experimental study to determine the physiology of the ciliary apparatus—the gills of *Mytilus edulis* (the edible clam) being employed in this instance.—*Michael Levine.*

DIFFUSION, PHYSICO-CHEMICAL PHENOMENA, PERMEABILITY

737. BARRAT, J. O. W. Die Struktur der Gele. [The structure of gels.] *Kolloid Zeitschr.* 28: 217-218. 1921.

738. BERGELL, PETER. Osmotische Extraktionsverfahren in der Landwirtschaft, besonders für Lupinenentbitterung. [The uses of osmotic extraction in agriculture, especially for removing the bitterness from lupines.] *Illustr. Landw. Zeitg.* 42: 108. 1922.—The author suggests briefly how the principle may be applied.—*John W. Roberts.*

739. BOGUE, ROBERT HERMAN. The sol-gel equilibrium in protein systems. *Jour. Amer. Chem. Soc.* 44: 1313-1323. 1922.

740. BOGUE, ROBERT HERMAN. The structure of elastic gels. *Jour. Amer. Chem. Soc.* 44: 1343-1356. 1922.

741. BORESCH, K. Über den Eintritt und die emulgierende Wirkung verschiedener Stoffe in Blattzellen von *Fontinalis antipyretica*. [The penetration and emulsifying action of different compounds in the leaf cells of *Fontinalis antipyretica*.] *Biochem. Zeitschr.* 101: 110-158. 1919.—The author has studied the nature of filiform nodules in the leaf cell of the plant in question and determined their fatty nature by microchemical means. The emulsifying action on these bodies of 4 chemical groups—alcohols, phenols, alkaloids and alkaloidal salts, and ammonia and its derivatives—is considered at length. It was found for alcohols that emulsification was effected by propyl and the higher alcohols but not by those lower in the series. Emulsification is here regarded as related to affinity for the fatty constituents of the nodule rather than to surface tension properties. The phenols were more or less comparable to the alcohols in action, their effectiveness as emulsifiers forming a descending series: thymol, α -naphthol, *o*-cresol, *m*-cresol, phenol, pyrocatechin, resorcin, hydrochinon, pyrogallol, and phloroglucin.—Emulsification by different alkaloids and their salts varied widely, depending in part, apparently, upon permeability. Emulsification was effected in descending order by quinine, cocaine, brucine, strychnine, and codeine. Morphine was entirely ineffective, the cells being practically impermeable thereto. Emulsification by these compounds is attributed to saponification of the fatty substance of the nodule.—In contrast with the results obtained in precipitation of tannin in cell sap by alkaloidal bases and salts, it was found that the threshold concentrations of emulsifying solutions of the free base and salt of an alkaloid were closely approximate. This is accounted for on the ground of permeability of the leaf cell to the alkaloid cation. OH ions intensified emulsification by alkaloids, as did their salts

and free bases, while H ions reduced such action without reducing toxicity, indicated by death of the leaves. The action of ammonia on the nodule is regarded as similar to that of alkaloids. Only those ammonia salts emulsified, the aqueous solutions of which were alkaline. —W. W. Bonns.

742. BRADFORD, S. C. Die reversible Sol-Gel-Transformation. [The reversible sol-gel transformation.] *Kolloid Zeitschr.* 28: 214-217. 1921.

743. FREUNDLICH, H. Ueber den Potentialsprung, der bei der Elektroosmose und verwandten Erscheinungen wirksam ist. [The potential difference, which is effective in electroosmose and related phenomena.] *Kolloid Zeitschr.* 28: 240-242. 1921.

744. GIRARD, PIERRE, et W. MESTREZAT. Recherches expérimentales sur la perméabilité sélective des cellules vivantes aux ions. Remarque à propos de l'expérience de Donnan sur le rouge Congo. [Researches on the selective permeability of living cells to ions. Comment on Donnan's experiments with Congo red.] *Compt. Rend. Soc. Biol.* 87: 448. 1922.—The authors point out certain differences between their hypothesis of differential permeability and that of Donnan. According to them, whenever there is a preponderance of either H or OH ions in at least 1 of the mediums separated by a permeable membrane, the latter becomes the seat of polarization which is an electrostatic force, and this results in an unequal diffusion of ions which can freely pass through the membrane. In Donnan's experiments with Congo red this is not the case, since the anion of this salt is colloidal and cannot go through the membrane.—S. Morgulis.

745. GIRARD, PIERRE, et W. MESTREZAT. Recherches expérimentales sur la perméabilité des cellules aux ions. Schème physico-chimique de la perméabilité sélective. [Experimental researches on the permeability of cells to ions. A physico-chemical scheme of selective permeability.] *Compt. Rend. Soc. Biol.* 87: 356-357. 1921.—The authors studied the passage through animal membranes of the ions of a neutral salt in the presence of an acid with a different anion. From these experiments they suggest an hypothesis to account for the fact that the ions of the salt do not pass in chemically equivalent amounts. This they ascribe to a polarization of the membrane as a result of which an electrical equilibrium is established on both sides of the membrane with the anions and cations of the salt unevenly distributed. [See also following entry.]—S. Morgulis.

746. GIRARD, PIERRE, W. MESTREZAT, et LI-SHOU-HOUA. Recherches expérimentales sur la perméabilité des cellules aux ions. Schème physico-chimique de la perméabilité sélective. [Experimental researches on the permeability of cells to ions. A physico-chemical scheme of selective permeability.] *Compt. Rend. Soc. Biol.* 87: 358-360. 1922.—[See also preceding entry.]

747. HANDOVSKY, H., und A. WEIL. Die Quellung von Kolloid-Gemischen. I. [The swelling of colloid mixtures. I.] *Kolloid Zeitschr.* 27: 306-311. 1920.—Preliminary to the study of the water-holding power of the components of protoplasm the authors have begun the investigation of other colloid mixtures. The addition of charcoal in amounts up to 0.3 gm. per gm. dry gelatin made as a 20 per cent gel exerts no observable effect upon the swelling of the mixture, but more than this amount of carbon diminishes the swelling. Mixtures of gelatin and lipoid behaved similarly. The authors consider that there is an adsorption compound formed that varies with each change in the amounts of the components to form a substance often very different in its properties with but a small change in its composition, water being shared by the components of the complex.—H. E. Pulling.

748. HATSCHKE, E. Die Eigenschaften von elastischen Gelen. [The properties of elastic gels.] *Kolloid Zeitschr.* 28: 210-213. 1921.

749. HATSCHKE, EMIL. *Diffusion in deformed gels*. Sci. Prog. [London] 17: 86-94. 3 fig. 1922.—A study of elastic gels showed that they remain isotropic for diffusion under stress, and the diffusion velocity is the same in the deformed and in the unstressed gel.—*J. L. Weimer*.

750. KOPACZEWSKI, W. *Les colloïdes et la vie*. Rev. Sci. Pures et Appl. 33: 358-364. 1922.—This is a general statement of the importance of colloids in every day life, and treats first of their importance in biology. Osmotic pressure is explained as due to the inflation and deflation of the colloids comprising the cell membrane. Form, growth, and movement are regarded as colloidal phenomena. Fecundation of the egg has been proved to be due to the formation of asters and the asters are the result of the coagulation of the colloids of the plasma—the passage of a sol to a gel. The importance of colloids in physiological functions such as nutrition, nerve functioning, and secretion is stressed.—*H. W. Anderson*.

751. LUERS, H., und M. SCHNEIDER. *Zur Messung der Solvation (Quellung) in Kolloiden*. [Measurement of the solvation (swelling) of colloids.] Kolloid Zeitschr. 28: 1-4. 1921.—A method is described by which the viscosity of the colloid in powder form in water is determined and this is shown to change parallel to the change in volume of the colloid.—*H. E. Pulling*.

752. LYON, T. L., and J. K. WILSON. *Liberation of organic matter by roots of growing plants*. Cornell Univ. Agric. Exp. Sta. Mem. 40. 7-43. 1921.—The plants were grown under sterile conditions in full nutrient solutions. The containers were flasks of 8 or 12 l. capacity. In experiments with maize, oats, pea, and vetch it was found that the nutrient solution used for each of these plants contained at the conclusion of the experiment an appreciable amount of organic nitrogen, exclusive of the amount present in the residual plant cells found in the precipitate of the solution. Maize was grown for a period of 53 days. In 4 cultures the dry weights of the individual plants varied from approximately 17 to 24 gm. The amounts of organic matter excreted from the roots varied from 353 to 466 mgm. The maximum ratio of organic matter excreted to the dry weight of the plant was 1:37. Some evidence is presented to show that peroxidase is liberated into the nutrient solution.—*L. Knudson*.

753. MESTREZAT, W., PIERRE GIRARD, et V. MORAX. *Recherches expérimentales sur la perméabilité cellulaire. Perméabilité de la cornée de l'oeil vivant*. [Experimental researches on cellular permeability. Permeability of the cornea of the living eye.] Compt. Rend. Soc. Biol. 87: 144-147. 1922.—The cornea is a double cellular membrane and lends itself for the experimental study of permeability *in vivo*. This was done by enclosing the eye of a rabbit (previously treated with novocaine) in a special glass bulb well fitted into the orbit and filling the bulb with the test solutions. After exposure for 30 minutes, the eye was carefully washed and the contents of the anterior chamber removed with a fine needle for analysis. The other eye served as the control. $\text{Ca}(\text{NO}_3)_2$ and MgSO_4 were used. The anions and cations of these salts do not penetrate through the cornea in equivalent amounts. Thus, 2 ions of (NO_3) go with 0.03-0.54 ions of (Ca) ; 1 ion of (SO_4) for every 0.38-0.65 ions of (Mg) . The acidity of the medium may increase the permeability, but it does not change the proportion of the ions.—*S. Morgulis*.

754. MÖLLER, H. P. *Rhythmische Fällungserscheinungen in pflanzlichen Zellmembranen*. [Rhythmical precipitation in plant cell walls.] Kolloidchem. Beih. 14: 97-146. 1921.—This is an experimental and theoretical study of zone formation with silver nitrate in the walls of cells from seed of wheat (several unnamed varieties), barley, oats, rye, *Brachypodium pinnatum*, from leaves of *Sedum maxium*, *Griselinia macrophylla*, and several unnamed plants. The bands in different tissues were of different degrees of distinctness and of different widths. The mechanism of formation of these bands is believed to be identical with that forming Liesegang's rings in gelatin and this conclusion is supported by: the form and structure of the bands, and the influence of outer conditions (validity of Fick's diffusion

law, influence of water content of the walls, concentration of silver nitrate employed, influence of precipitating salts in the wall, and the diffusion rate of silver nitrate). The results give further evidence of the colloidal nature of cell walls in plants. The corky integument and not the cellulose membrane is selectively permeable in the cereal grains. Photomicrographs illustrate the paper.—*H. E. Pulling*.

755. PIETRKOWSKI, G. Die Wirkung des Strophanthins auf Kolloide. [The effect of strophanthin on colloids.] *Biochem. Zeitschr.* 98: 92-104. *Fig. 1-6*. 1919.—By virtue of its high surface tension, strophanthin effects a precipitation of colloidal solutions. In the presence of hydrophilous colloids, such as gelatin, it reduced the swelling capacity of the latter.—*W. W. Bonns*.

756. PUTTER, ERICH. Untersuchungen über die kapilläre Steigvermögen der Bakterien in Filtrierpapier. [Capillary rise of bacteria in filter paper.] *Diss. Greifswald.* 34 p. 1919.

757. SVEDBERG, TH. Ein kurzer Ueberblick über die Physik und Chemie der Kolloide. [A brief review of the physics and chemistry of colloids.] *Kolloid Zeitschr.* 28: 193-201. 1921.—This is an address.—*H. E. Pulling*.

WATER RELATIONS

758. MASON, F. A. Revival of sporophores of *Schizophyllum commune*. *Nature* 109: 272-273. 2 *fig.* 1922.—Hairs forming the covering of the pileus show remarkable avidity for water. The rate of absorption is much greater than that of ink by blotting paper. This property probably enables the fungus in xerophytic exposures to take full advantage of small amounts of water.—*O. A. Stevens*.

759. MONTFORT, C. Tatsachen und Probleme der Moorökologie. [Facts and problems relating to the ecology of bogs.] *Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens* 1919: A14-A20. 1920.—The paper here reported was read at a meeting of the Natural History Society of Westphalia and the Prussian Rhine in June, 1919, and is largely devoted to a consideration of Schimper's theory of physiological dryness in bogs. The author first describes a series of guttation experiments, carried on with seedlings of Indian corn placed in solutions of various kinds. Poisonous and strongly osmotic solutions stopped the guttation completely, and reasons are given to show that this means an inhibition of water-absorption as well. Bog water, however, had little or no effect on the guttation, and the conclusion is therefore reached that physiological dryness of the environment is not the cause of the xerophytic features of bog plants.—*A. W. Evans*

760. PERALTA, FERNANDO DE. The control of soil moisture by means of auto-irrigators. *Philippine Agric.* 10: 467-477. 3 *fig.* 1922.—Lettuce (*Lactuca sativa*) was grown in pots watered by means of Livingston porous-cup auto-irrigators. The soil moisture content was kept nearly constant. A noteworthy gain in leaf area and dry weight was secured by using auto-irrigation, as compared with periodic watering.—*Sam F. Trelease*.

761. TRELEASE, SAM F. Incipient drying and wilting as indicated by movements of coconut pinnae. *Amer. Jour. Bot.* 9: 253-265. 1 *fig.* 1922.—Running ventrally along each side of the midrib of the pinna of the coconut leaf is a narrow strip of tissue, the "hinge," through the action of which the 2 wings of the pinna may take various positions. When the leaf is well supplied with water they are in approximately the same plane, but when there is a deficiency of water the 2 wings revolve downward, their lower faces approaching each other. In excised samples the angular divergence of the wings was measured and was found to be closely correlated with the water content of the leaf. In leaves attached to the plant the size of this angle may therefore be used as a measure of the water content of the leaf. Using this method, the greatest incipient drying was found to occur in the coconut between 1 and 3 p.m. Individual differences were observed between different plants as to the period of greatest drooping of the wings. The importance of such methods in providing a basis for proper cultivation is emphasized.—*E. W. Sinnott*.

MINERAL NUTRIENTS

762. EHRENBERG, PAUL. *Das Kalk-Kali-Gesetz.* [The calcium-potassium law.] *Landw. Jahrb.* 54: 1-159. 1919.—If a plant poorly supplied with potassium is supplied liberally with calcium, there results a decreased absorption of potassium which may have detrimental effects upon the plant. These effects may be overcome by increasing the potassium content of the fertilizer. Results of numerous experiments are reported in support of this law. Buckwheat and summer wheat were used and the dry weight, potassium, nitrogen, and phosphoric acid content of the plants were determined. A large supply of calcium was found to be responsible for a reduction in the absorption of potassium and also for the reduction in dry weight of the plants. If, however, sufficient potassium was added in time, the injury was wholly averted and the yield somewhat increased. A rather complete digest of the literature bearing on the calcium-potassium law is given.—A. R. C. Haas.

763. ESPINO, RAFAEL B. *Mineral requirement of rice.* *Philippine Agric.* 10: 313-319. 1922.—A review is presented of the literature on the mineral nutrient requirements of rice.—*Sam F. Trelease.*

764. GERICKE, W. F. *On the physiological balance in nutrient solutions for plant cultures.* *Amer. Jour. Bot.* 9: 180-182. 1922.—Instead of using a single complete nutrient solution for growing wheat seedlings, the author used 3, each one containing (in addition to iron) 2 of the essential elements. The plants were placed in each of these in succession for a day, and this rotation continued for 4 weeks. Six different combinations of these single-salt solutions were used in which the various elements were paired in different ways, and marked differences in the growth of the seedlings were noted between these combinations. Where KNO_3 , MgHPO_4 , and CaSO_4 were the 3 salts used, growth was almost as great as in a complete nutrient solution. Where KH_2PO_4 , CaSO_4 , and $\text{Mg}(\text{NO}_3)_2$ were used, growth was less than half as great. The author believes that the availability and utilization of essential elements by wheat seedlings are affected by the way in which these elements, presumably as ions, are paired. The utilization of nitrates, for example, seems to depend upon the supply of available potassium. Other cation-anion relations are also evident.—E. W. Sinnott.

765. JUNG, JOSEF. *Über den Nachweis und die Verbreitung des Chlors im Pflanzenreiche.* [The detection and the distribution of chlorine in plants.] *Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.)* Abt. I. 129: 297-340. 1 pl. 1920 [1922].—The most successful reagents for the detection of chlorine are: (a) thallium acetate 0.5 gm., glycerine 2 gm., distilled water 7.5 gm.; (b) silver nitrate 0.05 gm., 10 per cent ammonia 9.95 gm. The former gives very characteristic crystals but is not delicate enough for small traces of chlorides; silver nitrate is extraordinarily sensitive, and the crystals formed show a delicate and characteristic response to light.—A series of plants from bacteria and myxomycetes to spermatophytes, embracing 137 families and 604 species, were examined for chlorine content. Various ecological groups of seed plants were similarly tested. Such subdivisions as Equisetaceae, Cannabaceae, Amentiferae, Cruciferae, Euphorbiaceae, Umbelliferae, Compositae, Liliaceae, and Iridaceae are particularly rich in chlorine content, while other groups, such as the fresh water Cyanophyceae and Chlorophyceae, lichens, bryophytes, ferns, club mosses, conifers, Betulaceae, Salicaceae, Rosaceae, Ericaceae, and Orchidaceae contain very small quantities,—in fact, few plants were found which contained no demonstrable amounts.—Chlorine occurs as chlorides dissolved in the cell sap. There is a progressive increase in chloride content from the root upward; the largest quantities are found in the apical portion of the stem, the bast parenchyma, and the petiole and veins of the leaf; the leaf mesophyll, the epidermis, the flower parts, guard cells, and woody tissues contain mere traces of, or are free from, chlorides.—Plants characteristic of moist soils, rich in minerals, have the highest chloride content, those of moorlands and sandy soils generally lack it. The absence of chlorides among mosses, ferns, woody plants, epiphytes, and saprophytes is noteworthy.—F. Weiss.

766. MERKENSCHLAGER, FRITZ. *Die Chlorose der Lupine auf Kalkböden.* [The chlorosis of lupine on soils rich in lime.] *Fühling's Landw. Zeitg.* 70: 19-24. 1921.

767. MITSCHERLICH, A. *Vegetationsversuche mit physiologischen Reaktionen.* [Experiments with the physiological reactions of plants.] Landw. Jahrb. 54: 477-492. Pl. 5-6. 1919. —The author discusses the results of applying various amounts of fertilizer salts to sand cultures in which annual plants were grown. The increase in yield accompanying an increase in fertilizer salts follows, to a certain point, a logarithmic curve. Comparisons are given showing the effect of acid or of alkaline conditions on the yields produced by sodium nitrate, ammonium sulphate, urea, and urea nitrate.—*H. S. Reed.*

768. SKINNER, J. J., and F. R. REID. *Nutrient requirements of clover and wheat in solution cultures.* Soil Sci. 12: 287-300. Pl. 1, 3 fig. 1921.—Culture solutions with a concentration of 80 parts per million of P_2O_5 , NH_3 , and K_2O were used. Sixty-six solutions in all were employed, some containing each of the salts singly, combinations of 2, and combinations of 3, the ratio of the constituents varying in 10 per cent differences using the familiar triangular plan. Their results seem to verify the common belief that clover is a heavy potash-feeding plant and in general indicate that clover requires a higher proportion of K than of N or P, inasmuch as K was shown to be absorbed in larger proportion than P or N. In the case of wheat, better growth occurred with all 3 of the nutrient elements present, the best growth being in mixtures containing between 10 and 30 per cent PO_4 , 30 and 60 per cent NO_3 , and 30 and 60 per cent K. Greatest absorption occurred in the cultures with greatest growth.—*I. T. Scott.*

769. STUTZER, A. *Düngung mit Kohlensäure.* [Fertilizing with carbon dioxide.] Illustr. Landw. Zeitg. 42: 107-108. 1922.—Experiments are cited to show the greatly increased yield of tomatoes due to increased supply of carbon dioxide. The author advocates the handling of manure so as to favor optimum aerobic conditions for the bacteria and thus secure maximum supply of carbon dioxide.—*John W. Roberts.*

770. TOTTINGHAM, W. E., and E. J. RANKIN. *Nutrient solutions for wheat.* Amer. Jour. Bot. 9: 270-276. 1922.—The optimal nutrient conditions for wheat, as regards reaction, appear to differ as between the germination phase and the later growth of the plant. Hydrogen-ion concentrations which are endured by the plant in intermittently renewed solutions become unendurable when the solution is continuously renewed. Certain pH values which restrict the elongation of stem and root appear to favor the production of dry matter in these organs.—*E. W. Sinnott.*

771. ZIRGENSPECK, H. *Lassen sich Beziehungen zwischen dem Gehalte an Basen in der Asche und dem Stickstoffgehalte der Pflanzen aufstellen, die einen Rückschluss auf die Ernährungsart und die Excretion gestatten?* [Is it possible to establish relationships between the content of bases in the ash and the nitrogen content of the plant which permit a conclusion as to the plant's mode of nutrition and excretion?] Ber. Deutsch. Bot. Ges. 40: 78-85. 1922.—The author was prompted to this investigation by Stahl's observation that mycotrophic plants are characterized by a very small ash content. The starting point was the consideration that independent plants secure almost all their nitrogen in the form of salts of nitric acid. Therefore, if the nitrogen content of the plant were reduced to the base equivalent, an indicator would be secured of the manner in which nitrogen is absorbed or of the degree of salt excretion. The base equivalent was calculated as potassium, the ash being evaporated with hydrofluoric and sulphuric acids, and its weight multiplied by K_2/K_2SO_4 . This was then compared with the nitrogen equivalent for nitrates. In the case of mycotrophic plants (except where the presence of considerable iron interfered with the calculations) the nitrogen equivalent overbalanced the base equivalent. In the case of some only slightly mycotrophic plants the base equivalent was slightly in excess of the nitrogen equivalent. In many autotrophic plants a large base excess was found. In most of these cases there was no guttation. Where the nitrogen equivalent in autotrophic plants exceeded the base equivalent the author attributes this to the effect of guttation. In the case of mycotrophic, parasitic, and ammonia plants he attributes it to nitrogen taken in as nitrate. In the case of

autotrophic plants, especially orchids with which the author especially concerned himself, there was an increasing nitrogen equivalent excess with increase in mycotrophy. Analyses of acid soils upon which mycotrophic plants were growing showed practically no nitrogen as nitrate, but considerable as ammonia, or in other forms.—*Anna Sommer*.

PHOTOSYNTHESIS

772. BÜRGI, E., und C. F. VON TRACZEWSKI. Ueber die biologischen und pharmakologischen Eigenschaften des Chlorophylls. [The biological and pharmacological properties of chlorophyll.] *Biochem. Zeitschr.* 98: 256-283. 1919.—Experiments are reported with chlorophyll and with phaeophytin preparations on canaries previously rendered anaemic, to determine the effect of these substances on blood formation. The results indicate that both are effective in rebuilding blood corpuscles under the conditions noted.—*W. W. Bonns*.

773. GRIGORIEW, R. Ueber die blutbildenden Eigenschaften des Chlorophylls. [The blood building properties of chlorophyll.] *Biochem. Zeitschr.* 98: 284-293. 1919.—A confirmation and extension of the work of Bürgi and von Traczewski [see preceding entry] is afforded.—*W. W. Bonns*.

774. JACOBY, M. Über den Formaldehyd als Übergangsstufe zwischen der eigentlichen Assimilation und der Kohlenhydratbildung in der Pflanze. [Formaldehyde as the intermediate between true assimilation and carbohydrate formation in the plant.] *Biochem. Zeitschr.* 101: 1-6. 1919.—Starting with Willstätter's hypothesis of formaldehyde as the end product of the specific assimilation process preceding carbohydrate formation, the author attempts to demonstrate the direct utilization of the aldehyde by green leaves in darkness. Material studied was the abscised leaf of *Tropaeolum majus*, the petioles being immersed in water through cork stoppers which were rendered water tight with paraffin. Before being used in the experiment the leaves were kept in darkness for 48 hours. Apparatus is described by means of which the leaves were surrounded by an atmosphere of CO₂-free air and formaldehyde vapor, provision also being made for a sufficient degree of humidity in the experimental chamber.—One brief table is presented as representative of the kind of data secured. This shows that leaves subjected to formaldehyde from 24½ to 32 hours increased in dry weight from 12 to 15 per cent, as compared with an increase of 1.7 to 5.4 per cent in the controls. The author concludes that the aldehyde is "fixed" by the plant, but ventures no further opinion as to its subsequent conversion.—*W. W. Bonns*.

775. SIEBERT, ALFRED. Ergrünungsfähigkeit von Wurzeln. [Greening capacity of roots.] Dissertation. 37 p. Kiel. 1920.

776. WARBURG, O. Ueber die Geschwindigkeit der photochemischen Kohlensäure-zersetzung in lebenden Zellen. [The rate of CO₂ decomposition in living cells.] *Biochem. Zeitschr.* 100: 231-270. Fig. 1-11. 1919.—An extended study is made of factors affecting the rate of CO₂ decomposition, using the green alga, *Chlorella*. Cultural methods (nutrient solutions) and algal characteristics are described. Experimental methods, apparatus, and principles and formulae involved in the calculation of the data are given in detail. The factors affecting CO₂ decomposition and the results obtained may be summarized as follows: (1) CO₂ concentration. Using amounts of gas varying from $\frac{1}{10}$ to 10 times that of the mean atmospheric concentration, the assimilation rate in constant light intensity was proportional to the CO₂ concentration for the lower values; for the higher values (2×10^{-6} mols. per l. and upwards) assimilation still increased, but at a lower ratio. (2) Light intensity. At low intensities the assimilation rate was approximately proportional to illumination intensity. This fact together with that enunciated in (1) establish the inference that assimilation is proportional to the concentration of a "photo-chemical primary product" and the concentration of a secondary product with which the former reacts. (3) Temperature. Making corrections for concentration changes due to temperature differences, the temperature coefficient varied markedly with temperature and light intensity—at low intensity and moderate

temperatures (15–32°C.) the coefficient was unity. (4) Intermittent illumination. CO_2 decomposition was greater with intermittent light of high intensity than with continuous exposure of the same. With low intensity, no difference between continuous and intermittent exposure was observable. These results are discussed in relation to the work of Brown and Escombe. (5) Substances affecting permeability. Phenylurethan and cyanic acid showed in general similar results, dilute solutions effecting marked assimilatory inhibition, while respiration, in the case of the lower of such concentrations, was stimulated.—*W. W. Bonns.*

METABOLISM (GENERAL)

777. BIEDERMANN, W. *Der Lipidgehalt des Plasmas bei Monotropa hypopitys und Orobanche (speciosa).* [The lipid content of the protoplasm of *Monotropa hypopitys* and *Orobanche (speciosa)*.] *Flora* 113: 133–154. *Pl.* 4–5. 1919.—Because of the close association between chlorophyll and lipid substances in the chloroplasts of living leaves and because some experiments seemed to indicate that chloroplasts contain a greater proportion of lipid than the surrounding protoplasm, the author investigated the lipid content of the plants named in the title. These are parasitic, chlorophyll-free plants. Previous work on seed did not permit him to conclude that lipoids were contained in the protoplasm. The protoplasm is rich in lipoids, however, (about 5 per cent of the dry weight of *Monotropa* was a lecithin-like substance) and this appears to be distributed in 2 distinctly different ways: as crumby masses evenly throughout the cell and as small drops or compact bodies that have a definite place in the cell, which leads the author to believe that “a lipid must be pre-existent, at least as an ‘Anlage.’” Drawings of the lipid bodies and detailed descriptions of the tissues and chemical methods are given.—*H. E. Pulling.*

778. CURREY, GEOFFREY SAUNDERS. *The colouring matter of the scarlet Pelargonium.* *Jour. Chem. Soc. [London]* 121: 319–323. 1922.—“The anthocyan pigment contained in the petals of the scarlet pelargonium, James Kelway, is, therefore, the diglucoside pelargonin (pelargonidin [1 mol.] + dextrose [2 mol.]).” It was found to occur as an oxonium salt to the extent of about 6 per cent of the dry weight of the petals. Pure crystals of the anthocyanin chloride and anthocyanidin chloride were prepared by methods described in detail.—*F. E. Denny.*

779. EICHELBERGER, MARIETTA. *The carbohydrate content of navy beans.* *Jour. Amer. Chem. Soc.* 44: 1407–1408. 1922.

780. FORSTER, MARTIN ONSLOW, and WILLIAM BRISTOW SAVILLE. *Constitution of picro-rocellin, a diketopiperazine derivative from Roccella fuciformis.* *Jour. Chem. Soc. [London]* 121: 816–827. 1922.—Evidence regarding the constitution of picrorocellin, a colorless, crystalline, bitter substance, was obtained from *Roccella fuciformis*, a lichen, “probably coming from the west coast of Africa.” It was found to be a nitrogenous compound $\text{C}_{20}\text{H}_{22}\text{O}_4\text{N}_2$, and on this account was regarded as of especial interest because of the lack of reports, heretofore, describing nitrogenous substances isolated from lichens.—*F. E. Denny.*

781. KLEIN, GUSTAV. *Studien über das Anthochlor.* [Studies of anthochlor (anthoxanthin).] *Sitzungsber. K. Akad. Wiss. Wien [Math.-Nat. Kl.] Abt. I.* 129: 341–395. 1 *pl.* 1920 [1922].—Anthochlor is the name given by Prantl to a yellow color substance dissolved in the cell sap of yellow flowers and fruits. It is to be distinguished from anthocyanin by its color, from carotin and xanthophyll which are contained in plastids, and from flavones and xanthenes which occur as crystals. A survey of plants with yellow flowers was made to determine the occurrence and distribution within the plant of anthochlor. The presence of anthochlor was determined by microscopic examination and by water extraction. A chemical study was made of its properties, which showed anthochlor to be related to anthocyanin in constitution, properties, and distribution. In some respects, such as resistance to concentrated alkalies and the formation of crystalline acid-addition products with sulphuric acid, anthochlor resembles flavones. The existence of 3 types of anthochlor differing in their

reactions with acids and alkalies, and characteristic of different plants is indicated.—The shade or intensity of the yellow color of flowers bears no relation to the presence of anthochlor or colored plastids; sometimes the color may be due exclusively to one or the other in very closely related species, or plastids and dissolved coloring matter may occur together, the colored cell sap then occupying the outer border of the cell, or the tips of papilliform cells, while the plastids or crystals lie near the inner border.—*F. Weiss.*

782. MAIGE, A. *Influence de la concentration des solutions organiques sur la formation de l'amidon dans les cellules végétales.* [Influence of the concentration of organic solutions on the formation of starch in plant cells.] *Compt. Rend. Soc. Biol.* 86: 856-857. 1922.—Experimenting with beans, the author found that starch begins to appear in plants grown in a 0.2 per cent solution of sucrose (the cotyledons were cut away) and increases in amount with the increasing concentration of the sugar up to 10-15 per cent. With solutions of still greater concentration of the sucrose the starch content of the plant cells rapidly diminishes.—*S. Morgulis.*

783. MÖLLER, FRITZ. *Ueber eine Verbesserung der biologischen Bewertung pflanzlicher Gerbstoffe.* [An improvement of the biological determination of plant tannin.] Dissertation. 37 p. Carl Henstorffs: Rostock, 1919.—The author reviews the various quantitative methods for the determination of tannin and especially the red corpuscle method of Kobert. On the basis of a large number of experiments he suggests the addition of acid to the corpuscle solution as an improvement over the old procedure.—*A. F. Camp.*

784. NIERENSTEIN, MAXIMILIAN. *Catechutannins. Part I. Paullinia tannin.* *Jour. Chem. Soc. [London]* 121: 23-28. 1922.—Paullinia tannin was prepared in crystalline condition from the seed of *Paullinia cupana*. "It is soluble in alcohol, ethyl acetate, or acetic acid, but not in any other organic solvent." It gave color tests of the catechutannins and was precipitated by gelatin and alkaloids. The sodium and potassium salts, and the methylo-derivative of the tannin were formed. When a solution of the tannin was treated with emulsin from bitter almonds, dextrose and optically inactive β -gambier-catechin carboxylic acid were obtained.—*F. E. Denny.*

785. NIERENSTEIN, MAXIMILIAN. *The constitution of catechin. Part IV.* *Jour. Chem. Soc. [London]* 121: 604-613. 1922.—Two different specimens of *Acacia catechu* extract were used for the preparation of a catechin in crystalline condition. Details of methods used in preparing derivatives are given, and proofs offered regarding their molecular arrangement.—*F. E. Denny.*

786. NOACK, KURT. *Der Betriebsstoffwechsel der thermophilen Pilze.* [Basal metabolism of the thermophilic fungi.] *Jahrb. Wiss. Bot.* 59: 413-466. 1920.—A study of growth and respiration in a synthetic medium and in hay decoction was made on *Thermoascus aurantiacus*, *Anizia spadicea*, and *Mucor pusillus*. The data are presented under 5 divisions: basal metabolism at the optimum temperature, the influence of temperature on respiratory activity, the effect of the media on respiration, the influence of zinc sulphate on the respiratory activity at different temperatures, and respiration at reduced oxygen pressures. The respiratory quotient, $\frac{CO_2}{O_2}$ for the thermophilic fungi was normal for glucose, 1-1.09. The temperature quotient was low, i.e., the respiratory activity at the higher temperatures did not increase with the increase in temperature according to Van't Hoff's law. The economy coefficient was of the same order as that of the non-thermophilic fungi. The respiratory quotient was unchanged by reduction of temperature. *Thermoascus* reacted very quickly to changes in the composition of the media. Reduction in the O_2 pressure caused no change in the respiratory quotient but there was a marked increase during anaerobiosis.—*W. H. Chambers.*

787. PERKIN, ARTHUR GEORGE, and YOSHISUKE UYEDA. *Occurrence of a crystalline tannin in the leaves of Acer glabrala.* *Jour. Chem. Soc. [London]* 121: 66-76. 1922.—From

the leaves for *Acer ginnala* (Korean maple tree) an extract containing about 30 per cent tannin is used in Japan and China for cotton and silk black-dyeing. The chemical nature of the yellow coloring and tannin matters in the leaves was investigated. A crystalline tannin (termed acertannin), an amorphous tannin, ellagic acid, quercitin, and a "small amount of a phlobo-(catechol) tannin" were found. Acertannin gave deep blue and black colors on cotton, and was regarded favorably as a black dye for silk. The yellow coloring matter was crystallized out and found to be quercitin. The khaki color produced on wool by the leaf extract was attributed to the ellagic acid and quercitin rather than to the tannin itself.—*F. E. Denny.*

788. PFANNENSTIEL, W. Vergleichende Untersuchungen über die Extrahierbarkeit verschiedener säurefester Bakterien mit Äther-Acetongemischen. [Extraction of acid-fast bacteria with ether-acetone.] Zeitschr. Hygiene u. Infektionskr. 95: 87-99. 1922.—Differences in amount of lipoids extracted from the acid-fast bacteria are related to differences in staining properties and pathogenicity. An extensive bibliography is appended.—*W. H. Chambers.*

789. SIEKE, FRITZ. Phenolbildung durch Bakterien. [Phenol formation by bacteria.] Zeitschr. Hygiene u. Infektionskr. 94: 214-223. 1921.—By cultivation in a synthetic medium containing tyrosin 2 strains of phenol-forming bacteria, *Bacterium coli phenologenes*, and *B. paracoli phenologenes*, were isolated and studied.—*W. H. Chambers.*

790. VERKADE, P. E. On the action of micro-organisms on organic compounds. II. The solubility of some organic acids in fatty oils. Proc. Roy. Acad. Sci. Amsterdam [translated from Verslag K. Akad. Wetenschappen Amsterdam] 23: 783-789. 1921.—See Bot. Absts. 11, Entry 1345.

791. WEISS, M. Ueber den quantitativen Nachweis des Tyrosins mittels der Millonschen Reaktion. [The quantitative determination of tyrosin by means of the Millon reaction.] Biochem. Zeitschr. 97: 170-175. 1919.

792. WOHLGEMUTH, J. Ueber den vermeinten Abbau der Stärke durch Formaldehyd. Schlusswort an Frl. Woker. [On the supposed cleavage of starch by formaldehyde. Final reply to Miss Woker.] Biochem. Zeitschr. 99: 316-319. 1919.

METABOLISM (NITROGEN RELATIONS)

793. HONCAMP, F. Wie Können billigst eiweissreiche Futtermittel angebaut und hergestellt werden? [How can cheap protein-rich feeds be prepared?] Landw. Jahrb. 57: 107-137. 1922.—This is a general account of principles of variety selection, fertilization, conservation, and improved methods of utilization.—*Selman A. Waksman.*

794. LOEB, JACQUES. Proteins and the theory of colloidal behavior. 298 p., 80 fig. McGraw-Hill Book Co.: New York, 1922.—This book is concerned with the demonstration of the correctness of 2 important laws for proteins and with the explanation of the chemical and physical properties of proteins by the use of the 2 laws. It is first demonstrated that a protein is amphoteric, and when it exists on the acid side of the isoelectric point it reacts with anions according to ordinary stoichiometric laws, and on the alkaline side of the isoelectric point it reacts with cations. Thus in solutions of sodium chloride or hydrochloric acid of a pH of 4.7 or less gelatin exists as gelatin chloride. In solutions of sodium chloride or sodium hydroxide of pH greater than 4.7 it exists as sodium gelatinate. At the isoelectric point, pH 4.7, it can combine with neither cation nor anion. The second fact made use of to explain the action of proteins is Donnan's theory of membrane equilibria, which states that when a membrane separates 2 solutions of electrolytes one of which contains 1 ion which cannot diffuse through the membrane, the result will be an unequal distribution of the diffusible ions on opposite sides of the membrane. If gelatin chloride is placed in a solution of HCl

the relative concentration of free hydrochloric acid inside and outside the gelatin at the time of equilibrium is determined by the equation $x^2 = y(y + z)$, where x is the concentration of the hydrogen and chlorine ions outside, y is the concentration of the hydrogen and chlorine ions of the free HCl inside, and z is the concentration of the chlorine ions in combination with the gelatin. The 2 laws given above are used to replace hypotheses such as those of adsorption, the Hofmeister ion series, and hydration and dispersion hypotheses used to explain the combination of proteins with salts, their viscosity, swelling, osmotic pressure, etc.—*W. J. Robbins*.

METABOLISM (ENZYMES, FERMENTATION)

795. BACHRACH, E., et H. CARDOT. Influence de l'acidité initiale et de la concentration du milieu sur la marche de la fermentation lactique. [Influence of the initial acidity and of the concentration of the medium on lactic acid fermentation.] *Compt. Rend. Soc. Biol.* 86: 1127-1129. 1922.—With $\frac{1}{2}$ -2 per cent lactose the optimum initial acidity of the medium does not vary and seems to be proportional to the peptone concentration. Thus, with bouillons containing 10 gm. lactose per l. and 0.62, 0.31, and 0.155 per cent peptone, the optimum initial acidity was found to be 0.084, 0.042, and 0.021 N. Under conditions of optimum acidity, the concentration of lactose being constant, the rate of fermentation increases with the peptone concentration. In media containing 11.5, 6.4, 4.5, 3.1, and 1.4 gm. nitrogen per l. respectively, the lactic acid developed in 24 hours was 1.26, 1.02, 0.92, 0.68, and 0.50 N.—*S. Morgulis*.

796. BOKORNY, T. Beitrag zur Kenntnis der chemischen Natur der Enzyme. [The chemical nature of enzymes.] *Biochem. Zeitschr.* 100: 100-113. *Fig. 1*. 1919.—The author calls attention to the general similarity in proportions of the constituents of enzymes as shown by previous analyses, and determines the amino nitrogen of 11 enzyme preparations. The method is based on the reaction of alkyl-amino substances with nitrous acid: $\text{RNH}_2 + \text{HNO}_2 = \text{ROH} + \text{H}_2\text{O} + \text{N}_2$. The nitrogen is determined by gas displacement rather than by absorption. The data appear to add little to the generally accepted view of the protein nature of enzymes, under present standards of purity.—*W. W. Bonns*.

797. EULER, H., und O. SVANBERG. Zur Kenntnis der Pektase-Wirkung. [The action of pectase.] *Biochem. Zeitschr.* 100: 271-278. 1919.—The authors review briefly the comparatively scant literature on pectase and give results of studies with expressed juice of *Ribes nigrum*, *R. rubrum*, and *R. grossularia*. Acidity was determined in terms of pH. The results show that these species have a closely related natural acidity, the pH ranging from 2.8 to 2.96. The optimum for enzyme action, determined by addition of acid and alkali, appeared to be pH 4.3. No pectase specificity was evident, the enzyme of one species coagulating about equally effectively the juice of another.—*W. W. Bonns*.

798. FAWCETT, GEO. L. Estudio sobre levaduras productoras de alcohol. [Studies on alcohol-producing yeasts.] *Rev. Indust. Agric. Tucuman* 11: 100-103. 1921.—Experiments were carried out with a number of strains of yeasts obtained from distilleries engaged in making industrial alcohol from waste molasses. Certain of these gave a higher per cent of alcohol, indicating possibilities of selecting improved strains for commercial use.—*John A. Stevenson*.

799. HAEHN, H. Die Melaninbildung im autolysierenden Kartoffelpresssaft. [Melanin formation in the autolysis of potato juice.] *Biochem. Zeitschr.* 100: 114-129. 1919.—The author has studied the formation of melanin formed by tyrosinase action in the expressed juice of a number of potato varieties. The melanin standard is expressed in terms of cc. of 0.002 normal potassium permanganate solution necessary to decolorize 1 cc. of the boiled and filtered juice. Amino nitrogen content was also determined.—Melanin content varied considerably in the varieties tested. The autolytic values of the various extracts were obtained from the differences in melanin content before and after autolysis at a definite temperature. Storage of tubers for 6 months increased amino acid content and decreased tyrosinase action. Juice rendered slightly alkaline gave increased melanin formation.—*W. W. Bonns*.

800. MORDHORST, G. Über die Verbreitung eines Tannin und verwandte Stoffe spaltenden Enzyms im Organismus des Menschen und einiger Tiere. [The distribution of enzymes attacking tannins and related compounds in the body of man and some other animals.] Dissertation. 40 p. Carl Hinstorffs: Rostock, 1919.—The author discusses the chemistry of tannins, methods for detection of tannic and gallic acid, and the location of tannin-splitting enzymes in the animal body. He found tannin-splitting enzymes in the intestinal juices and liver, but not in saliva, gastric juice, blood serum, kidney, or spleen. A similar study was made of etelen, or trigallacetol; a triacetyethyl ester of gallic acid; tannigen, an ester formed from acetic acid and tannin; and tannoform, a condensation product of tannin and formaldehyde.—H. C. Young.

801. NEUBERG, C. Die physikalisch-chemische Betrachtung der Gärungsvorgänge. [The physico-chemical view of fermentation processes.] Biochem. Zeitschr. 100: 289-303. 1919.—This is a reply to Ostwald's criticisms [see Bot. Absts. 12, Entry 804].—W. W. Bonns.

802. NEUBERG, C., und J. HIRSCH. Die dritte Vergärungsform des Zuckers. [The third fermentation form of sugar.] Biochem. Zeitschr. 100: 304-322. 1919.—As a continuation of sugar fermentation studies in presence of alkaline salts, the authors studied the effect of potassium carbonate, dipotassium phosphate, magnesium oxide, tertiary and secondary sodium phosphate, hydroxides of zinc, aluminium and colloidal iron, and mixtures of primary and secondary sodium phosphates in yeast fermentation of sucrose. All the substances added were without effect on yeast invertase. The reaction in each instance occurred according to the equation: $2C_6H_{12}O_6 + H_2O = CH_3COOH + C_2H_5OH + 2CO_2 + 2C_2H_4O_3$. Acetic acid and glycerin were formed in the ratio of 1:2 mols. Hydroxides of aluminium and colloidal iron had no special effect on fermentation. The results in general support the theory previously advanced concerning sugar fermentation in presence of alkaline salts.—W. W. Bonns.

803. NEUBERG, C., und J. HIRSCH. Wirkungsweise der Abfangmethode bei der Acetaldehyd-Glycerin-Spaltung des Zuckers. Die Korrelation von Acetaldehyd und Glycerin innerhalb der gesamten Gärführung, der zeitliche Verlauf dieser Vergärungsform und ihre Beziehung zur gewöhnlichen alkoholischen Gärung. [The mechanism of the "fixation" method in the acetaldehyde-glycerine cleavage of sugar. The correlation of acetaldehyde and glycerine during the entire fermentation, the time factor in this process and its relation to ordinary fermentation.] Biochem. Zeitschr. 98: 141-158. Fig. 1-4. 1919.—The writers review the work of the senior author and others in which by means of "fixation" by alkaline salts acetaldehyde and glycerine are established as definite stages in the yeast fermentation of sugar. Such fermentations are grouped into: (1) The usual alcoholic fermentation ($C_6H_{12}O_6 = 2C_2H_5OH + 2CO_2$); (2) acetaldehyde-glycerine fermentation ($C_6H_{12}O_6 = CH_3CHO + CO_2 + C_2H_5OH$); (3) Acetic acid-ethyl alcohol-glycerine fermentation ($2C_6H_{12}O_6 + H_2O = C_2H_5OH + CH_3COOH + 2CO_2 + 2C_2H_4O_3$). The present work seeks to determine the acetaldehyde-glycerine relations during the process, their rate of formation and the relation of this type to the ordinary alcohol- CO_2 fermentation. It was found that at every stage during the fermentation in the presence of sodium sulphite acetaldehyde and glycerine are formed in equimolecular quantities. At the same time, ethyl alcohol and CO_2 are produced independently and in equivalent proportions. The stage of fermentation can thus be determined from the amount of alcohol or aldehyde present.—W. W. Bonns.

804. OSTWALD, W. Physikalisch-chemische Bemerkungen zu Neuberg's Gärungstheorie. [A physico-chemical consideration of Neuberg's fermentation theory.] Biochem. Zeitschr. 100: 279-288. 1919.—In this critical discussion of the work of Neuberg and others [see Bot. Absts. 7, Entries 1344, 1345] the writer, while accepting in general the former's fermentation theory, ventures to differ in the interpretation of some of the intermediate reactions in the process, basing his arguments on physico-chemical grounds.—W. W. Bonns.

805. TSCHERIKOWSKI, SALOMO AL. *Beitrag zur Kenntnis der Zellfermente.* [Cell enzymes.] Dissertation. 12 p. Berlin and Leipzig, 1921.—The author repeats the work of Abderhalden on specificity of cell enzymes. Using enzyme extracts from liver, muscle, spleen, and kidneys of rabbits, horses, and calves, and a peptone from each of the same organs he followed the hydrolysis of the peptone optically. He found that the kidney extract hydrolyzed all the peptones prepared, whereas the extracts from liver, muscle, and spleen were specific for the peptones from their respective organs. There was no 'species' specificity demonstrated.—A. F. Camp.

806. WOKER, G. *Zur Theorie der Diastasewirkung.* [The theory of diastase action.] *Biochem. Zeitschr.* 99: 307-315. 1919.—This is a critical discussion and defense of the author's previous work, replying to the criticism of Wohlgemuth [see Bot. Abstr. 8, Entry 651].—W. W. Bonns.

METABOLISM (RESPIRATION, AERATION)

807. MORSE, STERNE, and NICHOLAS KOPELOFF. *A simple method for anaerobic cultivation in Petri dishes.* *Amer. Jour. Public Health* 12: 119-121. *Fig. 1-3.* 1922.—Two Petri dish bottoms or covers of the same diameter are used. The culture or medium is poured and allowed to harden. It can then be streaked in the usual way. The paired dishes are then turned over and 5 to 10 gm. dry pyrogalllic acid placed in the now lower half. About 30 cc. of a 5 per cent solution of sodium hydroxide is quickly poured over the pyrogalllic acid. A strip of adhesive tape is immediately placed around the equator thus uniting the halves. The resulting "capsule" is then incubated and treated with no more respect than an ordinary aerobic plate. In order to maintain the condition of anaerobiosis for a long time it is only necessary to varnish the tape. The authors claim for the method that it is simple, inexpensive, efficient, easy to manipulate, and does not require other than stock apparatus.—C. A. Ludwig.

ORGANISM AS A WHOLE

808. DIXON, GUERNEY. *The transmutation of bacteria.* 179 p. Cambridge University Press: Cambridge, 1919.—Aside from certain cultural experiments the book is essentially a review and discussion, from the standpoint of possible transmutation of species, of the literature dealing with morphological and physiological variations in the species of bacteria. The author concludes that while incapable of proof, the transmutation of allied organisms in the human body is suggested but that supposed instances of transmutation experimentally induced rest on inconclusive evidence. An extensive bibliography is included.—C. C. Epling.

809. EULER, H., und J. LAURIN. *Zur Kenntnis der Hefe Saccharomyces Thermaetikonum.* [Concerning the yeast *Saccharomyces Thermaetikonum.*] *Biochem. Zeitschr.* 97: 156-169. 1919.—This is a discussion of experiments with the above organism dealing with optimum growth conditions, rate of fermentation, inversion capacity, catalase activity, and the effects of acidity and of antiseptics.—W. W. Bonns.

810. GAMBLE, F. W. *Studies in symbiosis.* [Rev. of: BUCHNER, P. *Tier und Pflanze in intrazellulärer Symbiose.* (Plants and animals in intracellular symbiosis.) xi + 462 p., 2 pl. Gebrüder Borntraeger: Berlin, 1921.] *Nature* 109: 538-539, 576-577. 1922.—The 1st part deals with algal associations in lower animals, the 2nd with symbiosis in insects, and the 3rd with bacteria as related to luminosity.—O. A. Stevens.

811. GREENBAUM, SIGMUND S. *On the biologic properties of pathogenic molds.* *Jour. Infect. Diseases* 31: 26-31. 1922.—The author points out the customary neglect of the biologic properties of the higher fungi in most mycological and bacteriological treatises and outlines. This is a study of several pathogenic forms from the standpoint of proteolytic and amylolytic ferments, their actions on various sugars and litmus, indol production, and the production of toxins. Briefly, it was found that while a proteolytic ferment, varying in solubility with

the organism, is common to all pathogenic molds studied, no amylolytic properties were demonstrable. They neither produce acids nor bases nor ferment saccharose, dextrin, glucose, levulose, maltose, or lactose. Two Tricophytons (*T. acuminatum* and *T. gypseum-asteroides*) as well as *Achorion Schoenleinii* were found to elaborate toxins fatal to guinea pigs.—*R. V. Allison.*

812. JORDAN, E. O., and W. B. SHARP. The serologic relationships between strains of the Pfeiffer bacillus. Influenza studies X. Jour. Infect. Diseases 31: 198-208. 1922.—In attempting to establish the essential nature of the various strains of the Pfeiffer bacillus it was found that, as a rule, each strain of the organism possessed a serologic individuality. Likewise, no correlation was found between indol production and agglutinative affinities except in strains isolated from meningitis. The inability to group the strains of this organism serologically is accepted as an argument against the assignment of any of its members to the primary causation of epidemic influenza. It is suggested that perhaps a race of "influenza-meningitis" bacilli is in process of evolution.—*R. V. Allison.*

813. KOSER, STEWART A. Development of Paratyphoidenteriditis group in various food-stuffs. Jour. Infect. Diseases 31: 79-88. 1922.—In the study of several type strains of the paratyphoid-enteriditis group in their ability to develop in miscellaneous food stuffs it was found that strains from the Gaertner group multiplied readily in the juices of many cooked vegetables but were rapidly destroyed in the juices of different fruits as well as in the acid liquor of sauerkraut. There was also observed a marked ability of the organism to spread through food stuffs but only under conditions of optimum temperature. It was also found that the development of the Gaertner group in food stuffs is not usually accompanied by visible alteration or spoilage.—*R. V. Allison.*

814. LAPICQUE, LOUIS, et THÉRÈSE KERGMARD. Changements dans la réaction de l'eau douce sous l'action des plantes aquatiques. [Changes in the reaction of fresh water under the influence of aquatic plants.] Compt. Rend. Soc. Biol. 87: 512-515. 1922.—Experiments were performed with the following plants: *Spirogyra*, *Potamogeton*, and *Elodea*. One gm. of fresh material was placed in 50-100 gm. water. The pH of the water (either from the Seine or from a spring) was determined colorimetrically at regular intervals. In the dark the alkalinity diminished and sometimes the water became rather acid. In the light the opposite phenomenon occurred, the alkalinity of the water rising from an initial pH value of 7.2-7.6 to 9-10. The mechanism of this change of reaction is obvious: it depends on the antagonism between the respiration of the plant liberating CO₂ and the assimilative processes of chlorophyll.—*S. Morgulis.*

815. MOORE, BARRINGTON. Influence of certain soil factors on the growth of tree seedlings and wheat. Ecology 3: 65-83. 6 fig. 1922.—A series of experiments was made at Mt Kisco, New York, to learn the effect of soils, especially alkaline soils, on natural vegetation. The soils used were glacial quartz sand, pure humus, and mixtures of the sand and humus. The wilting coefficients of these soils in moisture retention tests were 0.85, 43.5, and 2.4 per cent respectively. In the alkalinity tests the same soils were used with addition of 2, 4, and 6 per cent (by volume) of burnt lime, calcium oxide. Another series of soils with a lower admixture of lime was also used and all the soils were titrated for alkalinity. In seed-flats of these soils, red maple seedlings, and seed of wheat, *Pinus resinosa*, *P. Banksiana*, *P. rigida*, and *Thuja occidentalis* were planted. Seed of *Pinus Strobus* were also planted but did not germinate well enough to give results. Eight tables give the data in concrete form. Considering tops and roots, humus gave better results than sand or mixtures of sand and humus. It is assumed that the results with humus are due to the nitrogen content. Pine species, wheat, and *Thuja* responded favorably to humus in the order named. In the more alkaline soil series all plants died rapidly or eventually except *Thuja* and wheat, the 2 last named growing exceptionally well on the series with less lime. On the whole, it is held that slight alkalinity in the soil is far more toxic to plants than the same degree of acidity.—*H. H. M. Bowman.*

816. PHILIBERT, ANDRÉ, et GEORGES MATHIEU. **Nouveau procédé de l'analyse qualitative des eaux.** [A new procedure of qualitative examination of waters.] *Compt. Rend. Soc. Biol.* 86: 1004-1006. 1922.—The method depends on the addition of lead subacetate to the medium which contains 6 per cent peptone and 2.4 gm. phenol per l. The tubes with the water under examination are kept for 48 hours at 41°C. (1) The tubes which give the indol reaction contain *B. coli*. (2) Those which are blackened, but do not give the indol test, contain putrefying organisms other than *B. coli* or *B. proteus*, probably *para B.* (3) Those which turn black and give the indol test and turn gelose-lactose-litmus red contain *B. coli*, while (4) those which produce blue cultures contain *B. proteus*.—*S. Morgulis*.

817. RAMSBOTTOM, J. **Orchid mycorrhiza.** *Gard. Chron.* 71: 95-96. 1922.—This consists of brief notes on the symbiotic relation.—*P. L. Ricker*.

818. RAYNER, M. C. **Notes on mycorrhiza plants.** *Gard. Chron.* 71: 102, 152. 1922.—Notes are given on the symbiotic relation between fungous hyphae and beech, heaths, orchids, and various other plants.—*P. L. Ricker*.

819. TANNER, FRED W., and GAIL M. DACK. ***Clostridium botulinum*.** *Jour. Infect. Diseases* 31: 92-100. 1922.—Numerous soils as well as samples of feces and sewage were examined in the study of the distribution of *C. botulinum*. The results support, in general, the conclusions of Meyer and Geiger, who suggest the probability of regional distribution. The different strains of *Clostridium* studied were found to exhibit marked variations in their ability to resist dry heat.—*R. V. Allison*.

820. TORREY, JOHN C., and GEORGE T. BUCKELL. **Cultural methods for the *Gonococcus*.** *Jour. Infect. Diseases* 31: 125-147. 1922.—In the discussion of the media employed, special consideration is given the value of amino acids, moisture, reduced oxygen tension, and growth-stimulating substances. Besides presenting the comparative results of the several media used, suggestions for the primary isolation of the organism as well as the maintenance of the stock strains are included. Criteria for the identification of the *Gonococcus* are outlined and fermentation tests for the differentiation from other similar Gram-negative diplococci are emphasized.—*R. V. Allison*.

821. WRESCHNER, HANS. **Untersuchungen über die biologische Bedeutung der Kapsel beim *Micrococcus tetragenus*.** [The biological significance of the capsule in *Micrococcus tetragenus*.] *Zeitschr. Hygiene u. Infektionskr.* 93: 74-86. 1921.—Successive agar transplants of *Micrococcus tetragenus* showed a gradual decrease in capsule formation and virulence for white mice. In this way a capsule-free strain was isolated and compared with the capsulated culture. The former gave positive phagocytic and complement-fixing reactions. The analogy is drawn between the specific action of the capsule and that of a dialyzing membrane which protects the cell from the entrance of serum antibodies.—*W. H. Chambers*.

GROWTH, DEVELOPMENT, REPRODUCTION

822. BARTHOLOMEW, E. T. **Acid and water content of lemon fruits at different stages of development.** [Abstract.] *Phytopathology* 12: 107. 1922.

823. BAULE, B. **Prinzipielle Überlegungen zum Wachstumsgesetz der Pflanze.** [Considerations of the law of growth of plants.] *Landw. Jahrb.* 54: 493-506. 4 fig. 1919.—This is a discussion of physiological and mathematical aspects of Mitscherlich's equation for the growth of plants. The amount of growth made at any given time must be an integration of all factors up to that time. The course of the growth is determined by a purely time-function, but its limits are set by the life-duration of the plant. The growth law reflects in the size of the plant many changes in growth conditions during the growth period of the plant. The conditions in the middle of the grand period of growth are especially important. The absorption of nutrients appears to be so modified during the growth period that the effect

is a maximum, or, to state it in another way, the materials used in forming plant substance are the least possible.—*H. S. Reed.*

824. FISCHER, HUGO. *Beitrag zur graphischen Auswertung der Wachstumserscheinungen bei Pflanzen.* [The graphical determination of growth phenomena in plants.] *Zeitschr. Forst- u. Jagdw.* 51: 527-534. *Fig. 1-5.* 1919.—The relation of growth of a rye culm to the factors of atmospheric temperature and soil moisture is plotted. By plotting lengths of the culm as ordinates over the time of each measurement as abscissae a figure S is obtained, which the author is convinced will represent the growth of any single plant or any plant organ. In comparing a temperature curve with the curve of actual growth superimposed on the normal curve, it is found that checked growth coincides with increased temperature, and vice versa. The same result is encountered in the influence of precipitation on growth. In other words, the apparent paradox is due to the fact that the favorable or unfavorable effects of temperature and moisture on plant growth are not immediately felt, but are expressed by the plant during the following period, which varies directly in length with the length of the period during which the favorable or unfavorable condition continued.—*J. Roesser.*

825. KONINGSBERGER, V. J. A method of recording growth under various external influences. *Proc. Roy. Acad. Sci. Amsterdam* [translated from *Verslag K. Akad. Wetenschappen Amsterdam*] 23: 783-789. 1921.—The paper describes in detail a sensitive and improved form of auxanometer in which the plant carrying a very weak electric current and a contact makes and breaks the circuit, which by means of a relay controlling a stronger current, operates the recording apparatus. The time required for a definite growth increment is recorded.—*L. Knudson.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

826. ANONYMOUS. Plant sensitiveness. *Gard. Chron.* 71: 283. 1922.—Comments are made on a recent lecture by Keeble at the Royal Institute, in which the writer mentions many new facts on plant movements that have been discovered since Darwin's work and suggests the need of a new work on this subject brought up-to-date.—*P. L. Ricker.*

827. KONINGSBERGER, V. J. *Tropismus und Wachstum.* [Tropism and growth.] *Recueil Trav. Bot. Neerland.* 19: 1-136. 3 pl., 17 fig. 1922.—A new method of automatic registration of growth is described whereby measurement is made (1) in complete darkness and (2) during rotation with the clinostat. The auxanometer is located in the room where the experiments are conducted, whereas registration may be made in an adjacent room. The coleoptils of *Avena* in darkness show their highest range of growth upon having reached a height of between 31 and 37 mm. (average 34 mm.). The first green leaf was light insensitive; even an illumination of 90 M.K. had no influence. When plants were put in darkness after 5 hours of illumination no reaction occurred. Observing various growth curves under the influence of light, it is found that in all cases fluctuations ensue. The behavior of "rapidity of growth" and "susceptibility to light" is not a parallel effect.—*J. C. Th. U'phof.*

828. MEADE, R. M. Positions and movements of cotton leaves. *Jour. Heredity* 12: 444-448. 2 pl., 1 fig. 1921.—The leaves of *Gossypium hirsutum* move definitely in direct reaction to sunlight, and similar movements have been observed in other species of *Gossypium*. The leaves are heliotropic, the movement being controlled by pulvini situated at the base of the petiole.—*J. H. Kempton.*

GERMINATION, RENEWAL OF ACTIVITY

829. DARLINGTON, H. T. Dr. W. J. Beal's seed-viability experiment. *Amer. Jour. Bot.* 9: 266-269. 1922.—In 1879 Beal prepared 20 bottles, in each of which he placed 50 seed of each of 23 plants mixed with moist sand. These he buried deeply in the soil. At 5-year intervals a bottle was taken up and its seed tested for germination. The 8th test was made in the spring of 1920. Eight species germinated and the total percentage of germination was at least 8.2 per cent. This was somewhat better than the test of 5 years ago.—*E. W. Sinnott.*

830. KNOWLTON, H. E. **Studies in pollen, with special reference to longevity.** Cornell Univ. Agric. Exp. Sta. Mem. 52. 751-793. 1922.—For the experiments reported, pollen of *Antirrhinum majus* L. and that of *Zea Mays* L. were used. The former is long-lived; the latter short-lived. *Antirrhinum* pollen remained viable and capable of germination for 670 days, but the fertilizing power was retained for only 161 days. Death of *Antirrhinum* pollen is not due to desiccation, exhaustion of food material, or to loss of enzymes. Corn pollen is high in moisture content and the chief carbohydrate is starch. It remains viable for a period only of 1 or 2 days. One cause of death of corn pollen is loss of water, but this is not the only one. Protoplasmic changes must be involved in the death of both kinds of pollen. Many data are reported in the relation between various conditions of storage and viability.—L. Knudson.

TEMPERATURE RELATIONS

831. HARVEY, R. B. **Varietal differences in the resistance of cabbage and lettuce to low temperatures.** Ecology 3: 134-139. 6 fig. 1922.—It is desirable (1) to extend the range of crop plants by finding varieties which can withstand lower temperatures than the species in general and (2) to find varieties which can be hardened to low temperatures. The writer experimented with several varieties of cabbage and lettuce to find which ones might extend northward the range of these vegetables in winter culture. Among the cabbages the red varieties do not freeze so quickly as the green ones when the plants are placed in constant-temperature chambers equipped with refrigeration and electric thermal control apparatus. Many varieties of cabbage, both red and green, can easily withstand low temperatures after the plants have been hardened by exposure to low temperatures for varying periods. In lettuce, likewise, the writer finds that the different commercial varieties tested show great differences in the degrees of hardiness. A high sugar content of the leaves does not render the plants less susceptible to freezing, and hardiness seems to depend rather upon differences in the protein constituents of the cells.—H. H. M. Bowman.

832. MAGNESS, J. R. **Chemical and physiological studies of fruit storage.** Proc. Amer. Soc. Hort. Sci. 18: 169-172. 1921 [1922].—This paper presents a discussion of some of the work under way at the Marble Laboratory, Inc., especially that of the life conditions of the apple in storage.—W. E. Whitehouse.

RADIANT ENERGY RELATIONS

833. HARDER, RICHARD. **Lichtintensität und "chromatische Adaptation" bei den Cyanophyceen.** [Light intensity and "chromatic adaptation" in the Cyanophyceae.] Ber. Deutsch. Bot. Ges. 40: 26-32. 1922.—The author found, among 50 species of Cyanophyceae grown in culture, only 2 which showed clearly a color difference when grown in lights of different colors. His experiments were carried out with but 1 of these (*Phormidium foecolorum*). Boresch's results [Ber. Deutsch. Bot. Ges. 37: 1919] were confirmed. The more intense the colored light to which the cultures were exposed the more quickly the adaptive coloration resulted. In weak monochromatic light no change in coloration took place even though in some cases the illumination was sufficient to permit considerable growth. The author calls attention to the differences in coloration in Cyanophyceae induced by different intensities of white light, and he attributes largely to the intensity factor the various colors often exhibited by a given species growing in different locations out-of-doors or by different parts of a single filament.—Richard Holman.

834. HEILBRONN, A. **Das Wesen der Lichtperzeption höherer Pflanzen.** [The nature of light-perception in the higher plants.] Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens 1919: B15-B18. 1920.—A report is here given of a paper presented at a meeting of the Medical and Natural History Association of Münster, Germany, held in December, 1919. The author discusses the question whether plants perceive the direction of light or differences in light intensity, in connection with their heliotropic movements. Although he reaches no definite conclusion, he inclines to the opinion that the direction of the light is the more important factor in the process.—A. W. Evans.

835. NIENBURG, WILHELM. Die Keimungsrichtung von Fucoseiern und die Theorie der Lichtperzeption. [The direction of germination of Fucus eggs and the theory of light perception.] Ber. Deutsch. Bot. Ges. 40: 38-40. Fig. 1. 1922.—Such light as may penetrate the Fucus egg is rendered diffuse by the presence of the oil drops and fucosan and chlorophyll grains. Hence the author has used the eggs of *Fucus serratus* in an attempt to show whether light direction or differences in light intensity determine the direction of plant reactions to light. As is well known the rhizoid arising on germination of the egg is formed normally on the unilluminated side. In his experiments illumination was from below in such manner that in many cases $\frac{1}{2}$ of each fertilized egg was in the light, the other in darkness. In such cases the rhizoid always arose from the shaded portion and grew at right angles to the direction of the illumination. Fully illuminated eggs formed rhizoids on the side away from the light, growing parallel to its direction; and eggs entirely in the dark developed rhizoids in all directions. The author interprets these results to indicate that it is not light direction but difference in light intensity that determines the direction of germination in the structures studied.—R. M. Holman.

836. WIESSMANN, H. Einfluss des Lichtes auf Wachstum und Nährstoffaufnahme bei verschiedenen Getreidegattungen. [Influence of light on the growth and absorption of nutrients in various genera of grains.] Landw. Jahrb. 56: 155-168. 1921.—Summer rye, barley, and wheat were grown with the same fertilizers but some in the dim light of a court, others in direct light. Those in the dim light yielded less dry matter than those in strong light. The straw of those grown in dim light contained higher percentages of nitrogen, phosphoric acid, and potash than did those grown in strong light.—A. J. Pieters.

TOXIC AGENTS

837. BOAS, FRIEDRICH. Die Wirkung der Saponinsubstanzen auf die Hefezelle. [The effect of saponin substances upon yeast cells.] Ber. Deutsch. Bot. Ges. 40: 32-38. 1922.—The author has measured the carbon dioxide production of yeast cultures containing in each case, in addition to cane sugar and distilled water, 1 of the following: Quillayasaponin, sapotoxin, saponin (Merek-principally quillayasaponin), smilacin, digitonin and guajaksaponin. Among the cultures containing each saponin substance were those also containing either sodium nitrate, sodium chloride, lithium chloride, or magnesium nitrate. Controls with distilled water, with water and sodium nitrate, and with water and lithium chloride were also included. From the results of these experiments the author concludes that highly active saponin substances and such digitonin and smilacin as reduce fermentation injure the yeast cells by reason of the great change which they induce in the colloidal condition of the lipid; whereas the other saponin substances employed, which cause an increase in fermentation in solutions with little or no salts present, alter the colloidal condition of the lipid to a lesser degree and increase permeability without causing injury to the cell. He believes that his results taken together with those of R. Collander, Hansteen-Cranner, and Kahlos may be considered as establishing the truth of the lipid theory of permeability.—R. M. Holman.

838. COBET, R. Ueber den Einfluss der arsenigen Säure auf wachsende Gewebe. [The effect of arsenious acid on growing tissues.] Biochem. Zeitschr. 98: 294-313. 1919.—Solutions of arsenious acid and of arsenic salts proved toxic at dilutions of 1:200,000 to roots of garden cress, onions, and peas. No growth stimulus at lower concentrations was established. Frog spawn and tadpoles were more resistant, requiring as a lethal dose concentrations of 1:40,000.—W. W. Bonns.

839. JONESCO-MIHAESTI, et C, POPESCO. L'influence de la concentration en ions H sur le développement et la production de toxines par le bacille de Shiga. [Influence of H-ion concentration on the development and toxin production of the Shiga bacillus.] Compt. Rend. Soc. Biol. 86: 893-895. 1922.—The range of H-ion concentration within which *B. Shiga* develops is from pH 5.4 to pH 9.1, with the optimum concentration at pH 7.1. The produc-

tion of toxin was studied within a pH range of 7.3-8.5 and the maximum values for 24 hours were obtained at a pH of 7.5. At the end of 18 days the toxicity of all the cultures was the same.—*S. Morgulis*.

840. MÜLLER, A. Ist das unzersetzte Wasserstoffsperoxyd oder der aus ihm abgespaltene Sauerstoff Träger der Desinfektionswirkung? [Is the disinfecting action of hydrogen peroxide due to the whole molecule or to the oxygen split from it?] Zeitschr. Hygiene u. Infektionskr. 93: 348-371. 1921.—The disinfecting power of hydrogen peroxide and of hydrogen peroxide plus catalase was tested on *Bacterium coli* and *B. prodigiosum*. The disinfecting action of the hydrogen peroxide was attributed to the whole molecule, for the addition of catalase was inhibitory. The difference between endocatalase and ectocatalase in protecting the bacteria from hydrogen peroxide was studied. The H-ion concentration affected the reactions essentially according to its influence on the catalase.—*W. H. Chambers*.

841. PANISSET, L., et J. VERGE. Action de l'hyposulfite de soude sur le développement des microbes. [The influence of sodium hyposulphite on the development of microbes.] Compt. Rend. Soc. Biol. 86: 848. 1922.—A 1 per cent solution of sodium hyposulphite added to peptone media has no effect on the growth of various germs. A 2 per cent solution has a slight effect on some organisms, and even a 5 per cent solution leaves some pathogenic organisms unaffected.—*S. Morgulis*.

842. ROSENKRANZ, HEINRICH. Untersuchungen über die praktische Verwertbarkeit der oligodynamischen Wirkung der Kupfersalze auf Bakterien. [Investigations on the practical utilization of the oligodynamic action of copper salts.] Dissertation. 11 p. München, 1920.

843. WILCOX, HARRIET LESLIE. The effect of peptone upon the toxigenic property of *B. diphtheriae* No. 8. Amer. Jour. Public Health 12: 608-614. 1922.—The amount of toxin produced by the diphtheria bacillus is shown to be dependent upon the peptone used for several generations previous to the use of the culture for toxin production.—*C. A. Ludwig*.

PHYSIOLOGY OF DISEASE

844. HOPKINS, E. F. Hydrogen-ion concentration in its relation to wheat scab. Amer. Jour. Bot. 9: 159-179. 18 fig. 1922.—The relation of H-ion concentration to the growth of *Gibberella Saubinetii*, the causal organism of wheat scab, and to the ability of this fungus to produce infection in wheat was studied. The pathogen was grown (a) on liquid media the reaction being adjusted in 1 case by H_2SO_4 and NaOH and in another by phosphate solutions, and (b) on agar, adjusted by lactic acid. In each case, a distinct minimum point in the growth curve occurred at from pH 5.5 to pH 6.0. The fact that various reagents were used shows that this minimum was due to H-ion concentration and not to other molecules or ions. Seedlings were then grown in infected soil, the pH of which was controlled by H_2SO_4 and NaOH, and by HCl and NaOH. The degree of infection was here found to have a definite minimum at about pH 5.5. There is evidence from control series that the soil acidity also affects the rate of seed germination. The practical importance of these relations between acidity and wheat scab is pointed out.—*E. W. Sinnott*.

MISCELLANEOUS

845. ANONYMOUS. Do plants know time? Gard. Chron. 71: 189. 1922.—Comments are made on the article of F. F. Blackman [see Entry 846, this issue].—*P. L. Ricker*.

846. ANONYMOUS. [BLACKMAN, F. F.] Do plants know time? Gard. Chron. 71: 175. 1922.—Editorial comment is made on an article of R. Irwin Lynch [see Entry 847, this issue]. *Dracaena goldiana* has been noted to open its flowers each day at exactly 3:55 p.m. Leaf movements of the runner bean are noted. Remarks are also made on temperature and moisture factors.—*P. L. Ricker*.

847. LYNCH, R. IRWIN. **How are plants aware of time?** Gard. Chron. 71: 31. 1922.—The statement is made that plants flower at the right time as to calendar rather than at the right season according to physical conditions, and several examples are given. [See also Entry 846, this issue.]—*P. L. Ricker.*

SOIL SCIENCE

A. G. McCall, *Editor*

(See also in this issue Entries 6, 15, 39, 46, 52, 72, 73, 81, 86, 91, 93, 101, 102, 106, 111, 113, 118, 119, 205, 214, 215, 221, 239, 285, 312, 376, 428, 443, 473, 482, 522, 525, 752, 760, 762, 763, 767, 768, 769, 815)

848. ANONYMOUS. **A note on soil sterilization for tomatoes.** Bur. Bio-Tech. Bull. 5. 134-142. 1922.—The importance of destroying malignant organisms in the soil and leaving the benign ones is discussed. A report of the use of dichloreresol and cresol mixed with soap, dichloreresol absorbed in basic slag and *p*-toluene sodium sulfo-chloramide for soil treatment is given. Dichloreresol seems to stimulate growth.—*W. H. Tisdale.*

849. BAL, D. V. **Studies on the decomposition of some common green-manuring plants at different stages of growth in the black cotton soil of the Central Provinces.** Agric. Jour. India 17: 133-151. 1922.—Experiments on the decomposition of sunn-hemp (*Crotalaria juncea*) and dhaincha (*Sesbania aculeata*) at various stages of growth are described.—*A. Howard.*

850. BECHHOLD, H. **Ein Kapillarphänomen.** [A capillary phenomenon.] Kolloid Zeitschr. 27: 229-233. 1920.—The great concentration of salts in the upper layers of a porous structure, such as soil, brick, or unglazed porcelain, when the salt solution evaporates at the surface, is briefly discussed. The mechanism is not clear since when crystallization occurs the upper layers will be saturated while those below may contain undetectable amounts of the salt.—*H. E. Pulling.*

851. BROWN, P. E., and J. H. STALLINGS. **Inoculated legumes as nitrogenous fertilizers.** Soil Sci. 12: 365-407. 1921.—Clover or alfalfa were grown in both sterilized and unsterilized soil in pots, a part of the pots being inoculated with nitrogen-fixing bacteria. The nitrogen content of the tops and the roots was determined by the Kjeldahl method. From 12 to 23 cgm. of nitrogen was fixed per plant by clover and alfalfa on untreated soils. On the average 27 per cent of the total plant nitrogen was in the roots of clover at maturity under natural soil conditions, while with alfalfa 46 per cent of the total nitrogen was in the roots. With clover and alfalfa all the nitrogen in the tops and some of that in the roots came from the air. When clover and alfalfa are grown and the hay crops removed there may be some gain in the nitrogen in the soil, the amount of increase varying with the legume, soil type, inoculation, and general conditions.—*W. J. Robbins.*

852. BURGESS, P. S. **Studies on a drained marsh soil unproductive for peas.** Univ. California Publ. Agric. Sic. 4: 339-396. 21 fig. 1922.—The author reports field trials and pot cultures to ascertain the best treatments for promoting growth of peas, and includes extensive studies on the chemistry of an unproductive soil. An attempt was made to ascertain the rates of formation and the absolute amounts of soluble salts formed in the soil by various treatments. Calcium carbonate added to neutrality greatly increased nitrate production, while soluble phosphorus and potassium compounds, without lime, produced no effect. In the field, where drought conditions existed, the application of 1 ton of acid phosphate per acre produced an increase, while liming to neutrality did not increase the growth of peas over that of the check plots. In greenhouse cultures, applying lime or acid phosphate materially increased the amount of dry matter. A periodic study of the H-ion concentration showed that all of the soils to which neutral salts had been added were slightly but consistently less acid than the checks and that the H-ion concentration was notably lowered by acid phosphate. All the

compounds increased the concentration of the soil solutions under the growing crops in comparison with the untreated checks. Gypsum increased the solubility of potassium and magnesium. Calcium carbonate increased the solubility of all ions except potassium. The production of root nodules was inhibited by the applications of nitrates or of calcium carbonate. The addition of soluble phosphorus increased nodule formation, but potassium sulphate and gypsum were without effect.—*H. S. Reed.*

853. CHRISTENSEN, H. R. *Undersøgelser over Jordens stofomsættende Evne og disses Betydning for Jordbunnsforskningen.* [Investigations of the power of change of soils and its importance for soil science.] *Nordisk Jordbrugsforskning* 1921: 200-207. 1921.—The quantitative methods of bacteriological analysis indicated by Remy have proved very useful. Modified by the author by adding to the soil extract the active species of bacteria, they have gained importance for chemical soil analysis. A new series of experiments has shown that soils which are basic or close to the neutral point, and which show a considerable buffer action, not only give *Azotobacter* development in inoculated mannite solutions, but also break down mannite much more vigorously than the soils lacking in buffer action, i.e., the soils which require lime. For the soils not needing lime a correlation is shown between phosphate content and mannite decomposition, determined, not by the microflora, but by the chemical composition of the soil. Most important is the content of basic Ca-compounds and of easily soluble phosphates. Comparison with field tests have shown this correlation to be promising for a laboratory investigation of the need of phosphate in soils. Only soils of basic reaction and with a certain buffer action have a considerable content of CO_2 -soluble phosphates.—*Ernst Gram.*

854. EMERSON, PAUL. The colorimetric determination of soil in a colored water extract. *Soil Sci.* 12: 413-417. 1921.—By decolorizing with aluminium hydroxide, nitrates can be determined by the phenoldisulfonic acid method in soil extracts colored by soluble organic matter. The method is rapid and accurate.—*W. J. Robbins.*

855. ERDMAN, L. W. The effect of gypsum on soil reaction. *Soil Sci.* 12: 433-448. 1921.—Pot experiments in which gypsum was added in amounts from 100 to 2000 pounds per acre to an acid soil, neutral soil, and basic soil did not increase or correct the acidity as shown by the Tacke lime-requirement method. At the rate of 100, 200, and 500 pounds per acre it did not affect the pH of the soil; 1000 and 2000 pounds per acre increased the pH 0.21 and 0.28 respectively in an acid soil, 0.14 and 0.27 in a neutral soil, and 0.09 and 0.12 in a basic soil. Gypsum added at the rate of 500 pounds per acre to a neutral soil, made to vary in degrees of acidity by the addition of hydrochloric acid and calcium carbonate, did not affect the pH or lime requirement.—*W. J. Robbins.*

856. GAINES, P. L., and H. W. BATCHELOR. Influence of H-ion on growth of *Azotobacter*. *Science* 56: 49-50. 1922.—The maximum concentration permitting growth was found to be pH 5.9-6.0 for all strains isolated. At pH 6.1-6.4 growth was quite as vigorous as at lower values.—*C. J. Lyon.*

857. GREAVES, J. E. Influence of salts on bacterial activities of soil. *Bot. Gaz.* 73: 161-180. 1922.—In experimenting with the effect of soluble salts applied to soil upon the production of ammonia, nitrates, and soluble and organic phosphorus, it was found that these salts were toxic to bacteria, partly because of osmotic disturbances. That this is not the entire cause, however, was shown by the fact that there is an antagonistic effect of certain salts when applied together. The results therefore indicate that the toxicity of soluble salts toward soil microorganisms is due to an osmotic effect which makes it impossible for the cell to take up its normal nutrients, but permits foreign or unbalanced constituents to enter. The foreign or unbalanced salts interact with the cell proteins, forming foreign proteinates and thus rendering the protoplasm incapable of normal functioning. Many of these salts when applied in small quantities increased bacterial activities.—*I. V. Shunk.*

858. JONES, J. S., and J. C. REEDER. The use of silica crucibles for the determination of potassium in soils. *Soil Sci.* 12: 419-432. 3 fig. 1921.—By the use of an electric furnace and silica crucibles potassium can be determined accurately, thus eliminating the use of platinum.—W. J. Robbins.

859. KAPPEN. Bodenazidität und Kalkdüngung. [Soil acidity and liming.] *Mitteil. Deutsch. Landw. Ges.* 37: 660-663. 1922.—In this address the writer explains the causes of various forms of soil acidity, the relation of soil adsorption to acidity, the formation of injurious aluminum and iron salts, and the effect of physiologically acid fertilizers. The bad effect of soil acidity on the physical structure of the soil is pointed out. As remedies it is advised to abstain from the use of such fertilizers on acid soils and to apply instead lime as carbonate or oxide.—A. J. Pieters.

860. KILIENGER, A. Wie verhalten sich schwefelsaures Ammoniak und Salpeter im Boden? [What becomes of sulphate of ammonia and saltpeter in the soil?] *Mitteil. Deutsch. Landw. Ges.* 37: 353-354. 1922.—The author points out that the excess of the sulphate of ammonia is held by the colloids in the upper soil layers while excess of saltpeter is lost.—A. J. Peters.

861. KRAUS, W. Weitere Untersuchungen über das Bechhold'sche Kapillärphänomen. [Further investigations of Bechhold's capillary phenomenon.] *Kolloid Zeitschr.* 28: 161-166. 1921.—Bechhold noted [see Bot. Absts. 12, Entry 850] some experiments on the accumulation of salt crystals at evaporating surfaces of porous bodies that contained aqueous salt solutions. The author finds: evaporation is necessary for the accumulation; drying occurs as noted by Zsigmondy for the dehydration of silicic acid gel, i. e., it takes place at the surface and not gradually throughout, so the salt accumulates at the surface and there is no gradient of concentration below this layer. If a hydrophilic colloid is added the accumulation takes place only at a higher temperature; decreasing the wettability of the surface decreases the accumulation; in holes in the interior of gypsum the accumulation also occurs; it occurs likewise on filter paper pressed between glass plates with about 1 cm. protruding; also on flat surfaces when the liquid is placed thereon as a drop, but the surface must be wetted by the solution; solutions of high viscosity dry with an equal distribution of the salt, i. e., no accumulation at the surface.—H. E. Pulling.

862. LIPMAN, J. G., A. L. PRINCE, and A. W. BLAIR. The influence of varying amounts of sulfur in the soil, on crop yields, hydrogen-ion concentration, lime requirement, and nitrate formation. *Soil Sci.* 12: 197-207. 2 fig. 1921.—Inoculated and uninoculated sulphur was applied to plots on which barley and soybeans were being grown at the rates of 200, 500, 1000, 2000, and 4000 pounds per acre. Germination of the barley was fair on all plots, but was markedly depressed in the case of soybeans on plots with 1000 pounds per acre and over. Growth of barley was injured on 1000-pounds plots and over, being nearly all killed by the 4000-pound application. Soybeans showed normal growth with 200 and 500 pounds, but growth was depressed where larger amounts were used. The H-ion concentration did not change throughout the season on the 200- and 500-pound plots, but on the 1000- to 4000-pound plots the H-ion concentration increased after 4-8 weeks. The greatest change was from an initial pH of 5.6 in May to a pH of 3.5 in August on the 4000-pound plot treated with uninoculated sulphur. Applications of 200-500 pounds did not influence the lime requirement, but with heavier applications the lime requirement was decidedly increased. The authors believe that the H-ion concentration may give an approximation of the lime requirement varying with different soils and treatments. The nitrate content appeared to vary considerably showing a fairly close relationship to crop growth, the least amounts being found at the time the crops were matured. The relation between H-ion concentration and nitrate content indicates that nitrification is not generally inhibited by increased acidity of the soil.—I. T. Scott.

863. LIPMAN, JACOB G., SELMAN A. WAKSMAN, and JACOB S. JOFFE. The oxidation of sulfur by soil microorganisms. *Soil Sci.* 12: 475-489. 1921.—A liquid medium, pH 6.0-6.2

containing mineral salts, including tricalcium phosphate and elemental sulfur, was inoculated with a suspension of a compost in which sulphur oxidation was occurring. The pH of the medium was lowered to 1.2 and the soluble phosphate and sulphate increased. Dextrose interfered with the oxidation of the sulphur. The sulphur-oxidizing bacterium was isolated in pure culture by continual transfer, by dilution, and by using media of high acidity; it could not be grown on solid media. Experiments in liquid media with this bacterium in pure culture showed that there first occurs a rapid increase in acidity accompanied by an accumulation of soluble sulphate. The insoluble phosphate is then made soluble by the sulphuric acid. This change is accompanied by a decrease in soluble sulphate and a stationary phase in the acidity. As soon as all the insoluble phosphate is used up the acidity again increases. In 15 days 93.97 per cent of the insoluble phosphate was dissolved. Using media of different initial pH, best growth was obtained at pH 2.0-2.8. A brief description of the bacterium is given.—*W. J. Robbins.*

864. LYON, T. L., and JAMES A. BIZZELL. **Lysimeter experiments. II. Records for tanks 13 to 16 during the years 1913 to 1917 inclusive.** Cornell Univ. Agric. Exp. Sta. Mem. 41, 47-93. 1921.—The data recorded and discussed were obtained from a study of a Volusia silt loam of Tompkins County, New York, held in concrete lysimeters. (See Cornell Univ. Agric. Exp. Sta. Mem. 12 for a description of these lysimeters.) The soil used is of wide distribution in southern New York and is noted for its need of lime and general lack of fertility. Four lysimeter tanks were utilized, 2 being kept bare continuously while 2 were cropped successively to oats, Canada peas, maize, oats, and barley. One bare tank and 1 cropped tank received burned lime at the rate of 3000 pounds per acre at the beginning of the experiment. Manure at the rate of 10 tons an acre was applied to all 4 lysimeters in 1913.—The object of the work was to observe the removal of calcium and certain other constituents from the soil by drainage and cropping. In comparing the bare and cropped tanks, it was found that 82 per cent of the rainfall (average annual precipitation 33 inches) was lost by percolation from the former and only 62 per cent from the latter. The average annual percolation losses in pounds to the acre of nitrogen, calcium, and magnesium from the bare tanks were 52, 356, and 45 pounds respectively. Corresponding data for the cropped lysimeters were 10, 341, and 30. The comparative figures for potash and sulphur from the bare and cropped tanks were of a similar order but much less divergent. Only traces of phosphoric acid appeared in the drainage.—The addition of lime had no effect on the amount of percolation water. Liming seemed to favor nitrification, increasing to a marked degree the nitrogen in the drainage water and in the crops grown. An appreciable percolation increase of calcium was obtained by liming the bare soils. The total amounts of calcium removed from the cropped tanks, limed and unlimed, were identical. The influence of liming upon the magnesium was in the same direction although more total magnesium was removed from the limed and cropped soil than from the unlimed and cropped one. Liming had little effect on the percolation losses of potash, phosphoric acid, and sulphur although such a treatment increased the amounts of these constituents removed by the crops.—*H. O. Buckman.*

865. McCALL, A. G. **The lime requirements of Maryland soils.** Rept. Maryland Agric. Soc. 5: 328-331. 1920 [1921].—A soil testing campaign in Maryland showed that of 1,500 soils 5 per cent showed very strong acidity; 10, strong acidity; 27, medium acidity; 18, slight acidity; 14, very slight acidity, and 26, no acidity. The best form of lime to use is that which supplies the available lime at least cost.—*A. Lee Schrauler.*

866. MCHARGUE, J. S., and A. M. PETER. **The removal of mineral plant food by natural drainage waters.** Kentucky Agric. Exp. Sta. Res. Bull. 237. 331-362. 1921.—More than 50 samples of water from streams and springs in various parts of Kentucky were analyzed for phosphorus, potassium, nitrate-nitrogen, calcium, magnesium, sulphur, sodium, chlorine, and in a few instances manganese. Drainage water from limestone areas contains the greatest amount of mineral matter and that from sandstone areas the least. The waters from the sandstone areas contain more than twice as much potassium as those from limestone areas while

the amount of phosphorus depends on the amount contained in the soil from which the water flows. A positive correlation between nitrate-nitrogen and soluble phosphorus was found. The total mineral matter in solution in large streams is much less than that contained in small streams flowing from limestone areas. More extensive use of cover crops is advised to conserve much of the mineral nutrients now lost through drainage waters.—*W. D. Valleau.*

867. MATTSON, S. E. Die Beziehungen zwischen Ausflockung, Adsorption und Teilchenladung mit besonderer Berücksichtigung der Hydroxylionen. [The relations between flocculation, adsorption, and the electric charges on particles with special reference to the hydroxyl ions.] *Kolloidchem. Beih.* 14¹⁻¹²: 227-313. 1922.—Suspensions were made of a fine quartz powder, a plastic clay, and a strongly humus Sphagnum turf and these were treated with hydroxyl-yielding compounds and neutral salts. The hydroxyl ion is extensively adsorbed by soils. Flocculation is not only conditioned by the reduction of the charge on the particles but also by strongly charged particles that have adsorbed a large number of ions. The adsorbed ions act as binding members between particles. Hydroxyl ions are not to be considered as uniquely determining soil structure; those ions that remain in excess in the soil solution are of most importance. The ability of soil to adsorb hydroxyl ions influences the solubility of various compounds and explains the acidity of many soils. Many examples of equilibria involving these principles are worked out and the paper is illustrated with photographs and photomicrographs.—*H. E. Pulling.*

868. MELIN, ELIAS. Ultramikroskopische Mikroben im Waldboden. [Ultramicroscopic organisms in forest soil.] *Ber. Deutsch. Bot. Ges.* 40: 21-25. 1922.—Five hundred gm. of humus from a plantation of *Pinus sylvestris* not far from Berlin was extracted with 750 cc. of distilled water at room temperature for 24 hours. A portion of the extract was concentrated in vacuum to $\frac{1}{2}$ its original volume. Portions of the extract were passed through filters with fine, medium, and coarse pores and then added to culture media containing 10 per cent gelatine, 2 per cent glucose, and a little ammonium citrate or a few drops of bouillon. The filters used were Haën's membrane type. Various bacteria present in the soil passed the coarse filter. The extract passed through the medium filter showed no visible evidence of bacteria or other micro-organisms but caused liquefaction of the gelatine, while the extract passed through the finest filter did not cause liquefaction. The author believes the latter fact to be sufficient evidence that the liquefaction of gelatine by the extract passed through the medium filter was not caused by enzymes present in the soil. The concentrated extracts caused liquefaction much more quickly than those which had not been concentrated.—*R. M. Holman.*

869. MOLTE, O. Jauchekonservierung mit Abfallgips. [Urine conservation with waste gypsum.] *Mitteil. Deutsch. Landw. Ges.* 37: 41-42. 1922.—Experiments made showed that urine treated with gypsum gave no better result than did the untreated.—*A. J. Pickers.*

870. ODÉN, SVEN. Die automatisch registrierende Sedimentvorrichtung und ihre Anwendung auf einige kolloidchemische Probleme. [The automatic registering sedimentation apparatus and its use in some problems of colloid chemistry.] *Kolloid Zeitschr.* 26: 100-121. 1920.

871. PARR, S. W., ROBERT STEWART, ET AL. Potash shales of Illinois. *Illinois Agric. Exp. Sta. Bull.* 232. 229-252, fig. 1-6. 1921.—The potash shales of Illinois, their geology, distribution, and occurrence in Union County, and finely ground shale as a source of potassium for soil improvement are discussed in the 3 divisions of this publication. When used with lime on a potash-deficient peat soil, a shale from Union County, containing 5 per cent potash, benefited crops markedly under green house conditions.—*O. H. Sears.*

872. PEARCE, J. N., and L. E. MILLER. Some colloidal properties of Pleistocene clays and their bearing on the chemical theory of the formation of Gumbottl. *Jour. Phys. Chem.* 26: 1-24. 1922.

873. PEROTTI, RENATO. *Per la conoscenza dei rapporti fra microorganismi e pianta verde.* [Concerning our knowledge of the relation between microorganisms and green plants.] *Atti R. Accad. Lincei Roma Rend. Cl. Sci. Fis. Mat. e Nat.* 30: 233-237. 1921.—Sterilized decoctions of 3 types of cultivated plants, Cruciferae, Leguminosae, and Graminaceae,—were each inoculated with a suspension of garden soil, and the amounts of ammonification, nitrification, and denitrification determined. The maximum ammonification took place in the decoction of Leguminosae, the least in that of the Graminaceae. Denitrification was slight in all cultures. Nitrification was greatest in the Graminaceae and least in the Leguminosae. After 20 days there was abundant development of Hyphomycetes in the cultures of Leguminosae, only a few in Graminaceae, and almost none in Cruciferae.—*F. M. Blodgett.*

874. POPE, HAROLD B. *Nauru and Ocean Island. Their phosphate deposits and workings.* *Agric. Gaz. New South Wales* 33: 391-402. 3 fig., 2 maps. 1922.—History and descriptions of these deposits are given. The total deposits are estimated to be in excess of 100,000,000 tons of high grade phosphate.—*L. R. Waldron.*

875. PUCHNER, HEINRICH. *Die "Hysteresis" wässriger Aufschwemmungen humoser Boden.* [The "hysteresis" of aqueous extracts of humus soils.] *Kolloid Zeitschr.* 26: 159-168. 1920.—Extracts made with boiling water from a peat containing lime were turbid and at first gave an acid reaction; later the liquid became clear and was alkaline to litmus. The changes in the extract as its age increases and the differences in the residue left after slow evaporation at different ages are discussed with the aid of photographs and photomicrographs. The slow changes in the extract were due not only to chemical and physical reactions of the materials of the extracts, but low forms of plant life played a part and their growth formations were characteristic.—*H. E. Pulling.*

876. RAMANN, E. *Kalkdüngung und Kalkwirkung im Boden.* [The effect of calcium on soils.] *Illustr. Landw. Zeitg.* 42: 59-60. 1922.—A brief discussion is presented of the effects, chiefly chemical, of calcium carbonate and calcium oxide on soils.—*John W. Roberts.*

877. REED, J. W. *Practical significance of organic carbon-nitrogen in soils.* *Soil Sci.* 12: 491-495. 1921.—An examination of 37 soils failed to show a correlation between soil productivity and the organic carbon-nitrogen ratio.—*W. J. Robbins.*

878. RELWANI, LOKERAN L. *Kalar reclamation as carried out on the Sukkur Farm.* (Alkali soil reclamation in Sind, India.) *Poona Agric. Coll. Mag.* 12: 117-123. 1921.—The reclamation is difficult because of the heavy texture of the soil. Methods employed include (1) irrigation, with drainage ditches on the lower sides of fields; (2) growing suitable alkali-resistant crops, such as sava (*Panicum stagninum*) for 1-2 seasons; (3) scraping off efflorescent salts where accumulations are pronounced; and (4) plowing and planting to bersim (*Trifolium alexandrinum*), which gives a good stand after 1-2 years.—*Robert L. Pendleton.*

879. ROSSI, GACONIO. *Preliminary note on the microbiology of the soil and the possible existence therein of invisible germs.* *Soil Sci.* 12: 409-412. 1921.—A decanted extract of fresh soil was filtered through an aseptic Chamberland filter into flasks containing sterile culture media. After incubation the culture liquid was tested for products which might be formed by bacterial action. No evidence of indol production or the formation of nitrites was found.—*W. J. Robbins.*

880. RUSSELL, E. J. *Les micro-organismes du sol dans leurs rapports avec la croissance des plantes. Position actuelle du problème.* [The micro-organisms of the soil in their relation to the growth of plants. Present status of the problem.] *Ann. Sci. Agron. Française et Étrangère* 18: 49-67. 1921.—The author reviews the microbiological work with soil organisms at the Rothamsted station, emphasizing Russell and Hutchinson's protozoan theory to account for the beneficial effect of partial sterilization of the soil. Studies are being made on the rate

of decomposition in the soil of phenol, cresol, naphthaline, toluene, benzene, and other aromatic hydrocarbons, and a beginning has been made in the study of the comparative sterilizing efficiency of various agents and their derivatives. Results show that chloromethylene benzene is more efficient than methyl benzene, which in turn is more efficient than benzene, for 1 group of organisms reported.—*A. B. Beaumont.*

881. SHEDD, O. M. A comparison of the calcium content of some virgin and cultivated soils of Kentucky by an improved method for the estimation of this element. Kentucky Agric. Exp. Sta. Bull. 236. 303-330. 1921.—Because of the remarkable results obtained from the use of limestone on the soils of Kentucky, the calcium content of virgin and cultivated soils was studied in order to determine the effect of cultivation on this constituent. An improved method of estimating the total and easily-soluble calcium in soils is described. Tables are given showing the total and easily-soluble calcium in virgin and cultivated surface and sub-soils of 10 different soil areas of Kentucky. It appears that cultivation has caused a considerable loss of calcium. The best types of soils usually contain the largest amounts of calcium, phosphorus, sulphur, and manganese, and the poorest the lowest. Many soils were found to be so low in calcium that this deficiency requires consideration.—*W. D. Valleau.*

882. SJOLLEMA, B. Verland tusschen grasgroei, grondwaterstand en slootwater. [Relation between grass growth, ground water, and ditch water.] *Cultura* 34: 81-82. 1922.—The writer presumes that when the Zuider Zee has been drained it will have much influence upon the grass production of neighboring meadows and farm lands. In order to study the height of the ground water, it is advisable to place pipes vertically in the soil on the desired localities so that the height of the water may be measured.—*J. C. Th. Uphof.*

883. TAMHANE, V. A. Investigations into the nature of the salt lands of Sind (India). Bombay Presidency. Dept. Agric. Bull. 96. 57 p., 4 pl. 1920.—Much of the surface soil on the right bank of the Indus is medium to heavy textured, but often a sandy subsoil greatly facilitates good drainage. The left bank soils are heavier textured, with a variable tight subsoil. Numerous tables give the chemical composition, the percentages of alkali salts, and the mechanical analyses of the samples studied. In order to prevent new areas from being ruined by surface accumulations of alkali salts, economy in the use of irrigation water is urged. To prevent surface evaporation better tillage methods are advised.—*Robert L. Pendleton.*

884. UNGERER, ERNST. Versuche zur Klärung der Bildung von Schichten in Tontrübungen und deren Verwendung in der Bodenanalyse (zur Ermittlung der Teilchengrösse). [Researches to explain the formation of layers in clay suspensions and their application to soil analysis (to determine the size of particles).] *Kolloidchem. Beih.* 14²⁻³: 63-96. 1921.—The author reviews the literature dealing with explanations of this phenomenon. In his own experiments he centrifuged suspensions of ultramarine blue and ultramarine red and removed samples from each distinct layer, the particles of which were counted and measured. From these data and the dry weights of unit volumes of the suspensions, the weights of the individual particles were ascertained. The particles in different strata are decidedly different in size and weight. The size of particles was also determined by observations on the time required for settling and by calculation from Stoke's law. The agreement was good. The time of settling was also determined for a fine clay and for emulsions of gum arabic, various oils, and water. The agreement between observed and calculated diameters is good. From the velocity of migration of a layer and Stoke's equation the characteristic size of particles in the groups that correspond to the different strata can be obtained, and this may be used in soil analysis. Size and weight of particles must be considered as determining the strata which differ markedly from each other. Each layer extends to the bottom of the vessel. The temperature should be constant for good formation of strata. Layers form either in the presence or absence of electrolytes unless the electrolyte has marked coagulating power.—*H. E. Pulling.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 19, 238, 267, 323, 351, 438, 500, 516, 553)

GENERAL

885. ANONYMOUS. [Rev. of: MERRILL, E. D. *A bibliographic enumeration of Bornean plants*. Jour. R. Asiatic Soc. Straits Branch, Special number. 637 p. 1921 (see Bot. Absts. 11, Entry 3553).] Jour. Botany 60: 59-60. 1922.

886. ANONYMOUS. *The Index Kewensis*. [Rev. of: PRAIN, D. *Index Kewensis Plantarum Phanerogamarum*. 5th Suppl. 1909-1915 inc. iii + 277 p. Clarendon Press: Oxford. 1921 (see Bot. Absts. 11, Entry 3199).] Nature 109: 472-473. 1922.—Improvements over earlier volumes are noted in citation of date of publication of books and periodicals referred to and in fuller geographical citations.—O. A. Stevens.

887. ANONYMOUS. [Rev. of: WILDEMAN, E. DE. *Contribution a l'étude de la flore du Katangar*. [Contribution to the flora of Katangar.] viii cxxiv + 264 p. D. Reynaert: Bruxelles, 1921.] Nature 109: 548. 1922.

888. CAÑEDO, JENARO. *Flora de Jalisco y Colima*. [Flora of Jalisco and Colima.] Jalisco Rural [Mexico] 4: 545-547, 619-620, 640-641, 681-682, 703-704. 1922.—Brief popular descriptions are given with the Mexican common names of economic plants of Jalisco and Colima.—John A. Stevenson.

889. CHEESEMAM, T. F. *The vascular flora of Macquarie Island*. Australasian Antarctic Expedition 1911-14. Under the leadership of Sir Douglas Mawson. Sci. Rept. Ser. C.—Zool. and Bot. Vol. VII, Part 3. 4 to., 63 p., 1 map. William Applegate Gullick: Sydney, 1919.—The present publication is based primarily on collections made from December 1911 to November 1913 by Harold Hamilton. Thirty-four species of vascular plants, a number somewhat in excess of previous records, are recorded from Macquarie Island. One species of grass, *Triodia macquariensis* Cheesm., is new to science. Of the 34 species recorded 3 are endemic and not known to occur elsewhere. Of the remaining 31 all but 4 are found in the New Zealand subantarctic islands, and practically one-half of these are circumpolar—occurring in Fuegia or the South Georgia to Kerguelen groups of islands. The author concludes that "the present flora of Macquarie Islands, excepting only the three endemic grasses, does not date further back than the close of the last glacial epoch. Since then, in agreement with the other islands of the subantarctic zone, its history has been a history of plant-migration, mainly from the New Zealand outlying islands, but in some cases from the far-distant Kerguelen group."—J. M. Greenman.

890. GAUMÉ, JACQUES. [Rev. of: FLORA BATAVA. *Afbeelding in beschrijving der nederlandsche gewassen*. 400*-409* aflevering. The Hague, 1921.] Rev. Gén. Bot. 34: 320. 1922.

891. GEE, N. GIST. [Catalogue of plants of Kiangsu province.] Ko-Hsueh [Science—Publ. Chinese Sci. Soc.] 4: 1117-1124. 1919; 5: 207-212, 603-622, 729-748, 800-814, 1147-1165. 1920; 6: 211-229, 318-335, 417-434, 622-637, 720-733. 1921.—The writer has made a large collection of vascular plants in the province of Kiangsu, China. The present paper is a revised English edition of his first published list with the additional equivalent of a Chinese translation of the botanical descriptions and names by CHUNG-SHU CHIEN. A key in Chinese and in English to families of plants collected is appended.—Chunjen C. Chen.

892. HALES, B. J. **Selected western flora. Manitoba, Saskatchewan, Alberta.** *Small 8 vo., 181 p., 89 fig.* The Macmillan Company of Canada, Ltd: Toronto, 1922.—This work concerns ferns, fern-allies, and flowering plants of that part of North America mentioned in the title. It includes representative species of leading genera of the region, but makes no claim to completeness. It is intended primarily to meet the needs of students of high schools and collegiate institutions of the prairie provinces. A brief key to the families is given, but few keys are inserted for the differentiation of species. The specific descriptions are clear and concise.—J. M. Greenman.

893. HU, HSIEN SU. [A herbarium list of plants of Kiangsi and Chekiang.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 6: 1248-1254. 1921.—This list places on record 152 determined plants of the provinces of Kiangsi and Chekiang, China.—Chunjen C. Chen.

894. HU, HSIEN SU. [The botanical names of Kiangsi plants.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 6: 1144-1171, 1232-1247. 1921. [Text in Chinese.]—A list of botanical names for 518 species of vascular plants collected in the province of Kiangsi, China, is presented with the equivalent Chinese names in characters. The localities where the plants were collected are also recorded.—Chunjen C. Chen.

895. JATUL, P. A. **Mažas Botaniškas Žodynlis. Dalis I. Augmenu Vardai.** [Small botanical dictionary. I. Plant names.] Želmenija 2: 50-62, 67-72, 1922.—[See also Bot. Absts. 11, Entry 1049.]

896. SARASIN, FRITZ, and JEAN ROUX. **Nova Caledonia. Forschungen in Neu-Caledonien und auf den Loyalty-Inseln. Botanik.** [New Caledonia. Researches in New Caledonia and on the Loyalty Islands. Botany.] 4 to. Vol. I-L. iii. p. 177-311, pl. 7-8. C. W. Kreidel's Verlag: Berlin and Wiesbaden, 1921.—The present part of this extensive work is edited by HANS SCHINZ and A. GUILLAUMIN. Several specialists have cooperated in the study of different groups of plants. The taxonomic portion of the work consists of an enumeration of plants from the Gonystilacaceae to the Compositae inclusive, and a short supplement. A limited bibliography and synonymy, a statement of general distribution, together with the habitat of the plant in New Caledonia or in the Loyalty Islands accompany each species recorded. Detailed descriptions of several species new to science are given, as well as critical notes on previously published species. A chapter entitled Cécidies de la Nouvelle-Calédonie by C. HOWARD is included; and an extended chapter is added under the caption of Essai de Géographie Botanique de la Nouvelle-Calédonie by A. GUILLAUMIN. The new species and combinations included are: *Grewia crenata* Schinz & Guillaumin (*Mallorocca crenata* Forster), *Hybanthus ilicifolius* Schinz & Guillaumin (*Ionidium ilicifolium* Vieill.), *Eugenia Sarasinii* Guillaumin, *Xanthostemon sulfureum* Guillaumin, *Rapanea Rouzii* Guillaumin, *Achradotypos Sarasinii* Guillaumin & Dubard, *Solanum campostylum* Bitter, *S. neo-caledonicum* Bitter & Schlechter, *S. noumeanum* Bitter, *S. Vieillardii* Bitter, *Pseuderanthemum loyaltense* Guillaumin, *Psychotria pulchrebracteata* Guillaumin, *Ficus marcescens* Warburg, and *Moorea streptophylla* Guillaumin.—J. M. Greenman.

897. SARGENT, C. S. [List of determinations of plants collected in Chekiang.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 7: 269-273. 1922.—The author presents a list of 98 plants, collected in Chekiang province, China.—Chunjen C. Chen.

898. TURRILL, W. B. [Rev. of: VALLENTIN, Mrs. E. F. **Illustrations of the flowering plants and ferns of the Falkland Islands.** With descriptions by Mrs. E. M. Cotton. xii + 64 pl. + text + ii. L. Reeve and Co.: London. 1921 (see Bot. Absts. 11, Entry 3201).] *Nature* 109: 370. 1922.

SPERMATOPHYTES

899. ANONYMOUS. [Rev. of: GAMBLE, J. S. **Flora of the Presidency of Madras. Pt. 4. Rubiaceae to Ebenaceae.** p. 579-768. Adlard and Son and West Newman: London, 1921 (see Bot. Absts. 10, Entry 1413).] *Nature* 108: 464. 1921.

900. BATTANDIER, J. A. *Labiée ligneuse du Maroc constituant un nouveau type générique.* [Ligneous mint of Morocco constituting a new genus.] Bull. Sta. Recherches Forest. Nord, Afrique 1: 200-201. Pl. 21. 1921.—The type description of a new woody plant of the mint family is given. It is the only species of a new genus, *Pitardia*, and is named specifically *P. nepetoides* Batt.—J. Kittredge, Jr.

901. BLAKE, S. F. A remarkable new species of *Ichthyothere*. Jour. Washington [D. C.] Acad. Sci. 11: 301-303. Fig. 1. 1921.—This genus, which is represented by about a dozen species, all South American, is of economic importance among the natives because the bruised leaves and stems when placed in water tend to stupefy fish, making them easy to capture. All the previously known plants are distinguished by being low herbs or somewhat shrubby plants with compact inflorescence. A new species, collected by F. W. Pennell in Colombia, has loosely racemose-panicled heads and climbing habit. It is described under the name *I. scandens* Blake.—Helen M. Gilkey.

902. BLAKE, S. F. Key to the genus *Diplostephium*, with descriptions of new species. Contrib. U. S. Nation. Herb. 24: 65-86. Pl. 21-28. 1922.—The introduction to this paper contains a history of the chiefly South American genus *Diplostephium* of the family Asteraceae, with a discussion of the characters afforded by the modifications of the style branches in the genus and of their evolutionary significance. It is followed by a description of the genus and a key to the 5 groups and 40 species recognized. An additional doubtful species is also listed. The following new species and new names occur: *Diplostephium adenachaenium*, *D. empetrifolium*, *D. parvifolium* (*D. microphyllum* Wedd., not Nees), *D. pycnophyllum*, *D. macrocephalum*, *D. cicatricosum*, *D. oblancoelatum*, *D. baccharideum*, *D. revolutum*, *D. Weddellii* (*D. sessiliflorum* Wedd., not Spreng.), *D. sejaense* (Kuntze), *D. umbelliferum*, *D. pleistogynum*, *D. costaricense*, *D. obtusum*, *D. bicolor*, *Aplopappus canus* (A. Gray), *Gynoxys foliosa* (Rusby). Eight of the new species described are illustrated by photographs.—S. F. Blake.

903. BLAKE, S. F. Two new species of *Acanthospermum* from the Galapagos Islands. Jour. Washington [D. C.] Acad. Sci. 12: 200-205. Fig. 1. 1922.—*Acanthospermum brachyceratum* and *A. leptolobum* are described, and a key is included for these 2 species, together with *A. leocarpoides*. These are all the known species belonging to the *Lecocarpopsis* section of the genus, and are all from the Galapagos Archipelago.—Helen M. Gilkey.

904. BUSCALMONI, LUIGI, e GIUSEPPE MUSCATELLO. Studio monografico sulle specie americane del gen. "Saurauia" Willd. [Monograph of American species of the genus *Saurauia* Willd. (continued).] Malpighia 29: 231-246. 1922.—Several varieties of *Saurauia leucocarpa* Schlecht. are compared and their affinities discussed.—Edith K. Cash.

905. CANDOLLE, CAS. DE. Zwei neue Piper aus Neu-Mecklenburg. [Two new Pipers from New Mecklenburg.] Bot. Jahrb. 57: 354-355. 1922.—This is No. 71 of Series VIII of the Beiträge zur Flora von Papuasien. *Piper Peekelii* and *P. anisopleurum*, both of the Bismark Archipelago, are described as new.—K. M. Wiegand.

906. COWAN, J. M., and A. M. COWAN. The species of the genus *Dipterocarpus* found in the Chittagong District. Indian Forester 48: 68-73. Pl. 5-6. 1922.—The 6 known species of *Dipterocarpus* are described and a key for their identification is given. That more species have not been found is probably due to the size of the trees and the fragmentary specimens which have been secured.—E. N. Munns.

907. DIELS, L. Die Myrtaceen von Papuasien. [The Myrtaceae of Papuasiasia.] Bot. Jahrb. 57: 356-426. Fig. 1. 1922.—This is No. 72 of Series VIII of the Beiträge zur Flora von Papuasien. The Myrtaceae of Papuasiasia comprise 20 genera and 160 species. With respect to this family the region may be divided geographically and as to affinities into (a) the primary forest and mountain bush, and (b) the savannahs and secondary bush. The former is further

divided into (1) the coast zone up to 1000 m. altitude, and (2) the upper zone above 1000 m. The Myrtaceae of the coast zone are related to those of Malasia and west and north Australia. In the upper zone there is a strong element related to plants in widely different parts of the world, even South America, suggesting that the mountains of Papuaia possess an important element of the ancient flora of the southern hemisphere. The savannah region shows a distinct relation to drier portions of Australia. The genera included are *Rhodamnia* Jack., *Myrtella* F. v. M., *Xanthomyrtus* Diels, *Psidium* L., *Decaspermum* Forst., *Octamyrtus* Diels, *Jossinia* Comm., *Eugenia* L., *Rhodomyrtus* DC., *Jambosa* DC. (50 species), *Syzygium* Gärtn. (44 species), *Xenodendron* L. & S., *Metrosideros* Banks, *Mearnsia* Merrill, *Xanthostemon* F. v. M., *Tristania* R. Br., *Eucalyptus* L'Her., *Leptospermum* Forst., *Melaleuca* L., and *Baeckea* L. The following new species, varieties, and combinations are proposed: *Rhodamnia Ledermannii*, *R. sepicana*, *R. polyantha*, *R. lamprophylla*, *Xanthomyrtus fasciculata*, *X. Schlechteri*, *X. longicuspis*, *X. longicuspis*, var. *fruticosa*, *X. scolopacina* (*Eugenia scolopacina* Ridley), *X. Pullei*, *X. polyclada*, *X. Klossii* (*Myrtus Klossii* Ridley), *X. arfakensis* (*Myrtus arfakensis* Gibbs), *X. linnaefolia*, *X. koëbrensis* (*Myrtus koëbrensis* Gibbs), *X. calythrachoides*, *X. prostrata* (*Myrtus prostrata* Gibbs), *X. compacta* (*Myrtus compacta* Ridley), *Decaspermum leptanthelium*, *D. arfakense*, *D. laxiflorum* (*Nelitris laxiflora* Bl.), *D. prunoides*, *D. humifusum*, *D. petraeum*, *D. coriandri* (*Nelitris coriandri* Bl.), *D. rhodoleucum*, *Octamyrtus pleiopetala* (*Eugenia pleiopetala* F. v. Müll.), *O. insignis*, *O. Behrmannii*, *Jossinia Schlechteri*, *Rhodomyrtus novoguineensis*, *Jambosa longipes* Warb. var. *leptopoda*, *J. Bartonii* (*Eugenia Bartonii* Bailey), *J. gonatantha*, *J. papuana* (?*Decaspermum papuanum* Lauterb.), *J. Leonhardi*, *J. keroantha*, *J. platycarpa*, *J. alutacea*, *J. verniciflora*, *J. brevicyma*, *J. riparia*, *J. salicina*, *J. phacelantha*, *J. polyphlebia*, *J. gonioptera*, *J. cladoptera*, *J. combretiflora*, *J. zylopiacea*, *J. tympanantha*, *J. soliflora*, *J. tricolor*, *J. trachyantha*, *J. lagynocalyx*, *J. pycnantha*, *J. pachyantha*, *J. decoriflora*, *Syzygium triphlebium*, *S. orthoneurum*, *S. modestum*, *S. Pullei*, *S. subsimile*, *S. Schumannianum* (*Jambosa Schumanniana* Niedenzu), *S. cruriflorum*, *S. Schlechteri*, ?*S. recurvo-venosum* (?*Jambosa recurvo-venosa* Lauterb.), *S. heloanthum*, *S. dictyoneurum* and var. *oreogonum*, *S. Caroli*, *S. viburnoides*, *S. Torricellianum*, *S. rosaceum*, *S. leptophlebium*, *S. platypodum*, *S. leptoneurum*, *S. oxyphyllum*, *S. scytophyllum*, *S. tolypanthum*, *S. ganophyllum*, *S. leucoderme*, *S. effusum* (*Eugenia effusa* A. Gray), *S. homichlophilum*, *S. petraeum*, *S. leptanthelium*, *S. taeniatum*, *S. benjaminum*, *S. alatum* (*Aphanomyrtus alata* Lauterb.), *S. lamprophyllum*, *S. gyrostemoneum*, *S. brachyanthelium*, *S. pyrophloeum*, *S. dolichorhynchum*, *S. Peekelii*, *S. iteophyllum*, *Metrosideros brachyanthera*, *M. iteophylla*, *M. Pullei*, *M. hypargyrea*, *M. aurea* (*Bachhousia aurea* Ridley), *M. Gibbsiae* (*Bachhousia arfakensis* Gibbs), *Mearnsia ramiflora* (*Metrosideros ramiflora* Lauterb.) and var. *humilis*, *Tristania oreophila*, and *Eucalyptus Schlechteri*. The genera *Xanthomyrtus* and *Octamyrtus* are described as new.—K. M. Wiegand.

908. DIELS, L. Beiträge zur Kenntnis der Combretaceen von Papuaien. [Contributions to the knowledge of the Combretaceae of Papuaia.] Bot. Jahrb. 57: 427-430. 1922.—This is No. 73 of Series VIII of the Beiträge zur Flora von Papuaien. Notes are given on the 2 species of *Combretum* L. and the 8 species of *Terminalia* L. known from Papuaia. *Terminalia oreodum*, *T. phaeoneura*, and *T. sepicana* are described as new. *Combretum flaco-rirens* Lauterb. is *Pygeum dolichobotrys* Lautb. & Schum., *Terminalia trinervia* Lautb. & Schum. belongs to the Flacourtiaceae and should be called *Bennettia trinervia* (Lautb. & Schum.) Gilg. n. comb.—K. M. Wiegand.

909. DIELS, L. Die aus Papuaien bekannten Theaceen. [The Theaceae known from Papuaia.] Bot. Jahrb. 57: 431-435. 1922.—This is No. 74 of Series VIII of the Beiträge zur Flora von Papuaien. The Theaceae do not form an important part of the flora of Papuaia. Those found are all above 500 m. altitude, mostly between 1000 and 2000 m. Four genera and 8 species are listed. The genera are *Gordonia* Ell., *Ternstroemia* L., *Adinandra* Jack., and *Eurya* Thunb. The following species and varieties are described as new: *Adinandra calosericea*, *Eurya leptantha*, *E. tigang* K. Schum. vars. *meizophylla* and *phyllopeda*, and *E. oxysepala*.—K. M. Wiegand.

910. DIELS, L. **Die Dilleniaceen von Papuasien.** [The Dilleniaceae of Papuaasia.] Bot. Jahrb. 57: 436-459. 1922.—This is No. 75 of Series VIII of the Beiträge zur Flora von Papuaasia. In this paper 3 genera and 56 species are treated. The genera included are *Dillenia* L., *Tetracera* L., and *Saurauia* Willd. (41 species). The following new species, varieties, combinations, and names are proposed: *Dillenia macrophylla* (D. *alata* var. *macrophylla* Lauterb.), *D. calothyrsa*, *D. montana*, *D. Schlechteri*, *D. castaneifolia* Miq. var. *dolichobotrys*, *Tetracera lanuginosa*, *T. floribunda*, *T. pilophylla*, *Saurauia meandra*, *S. drimytiflora*, *S. desquamulata*, *S. iboana*, *S. Schumanniana* (*S. rosea* Lauterb., not Jungh.), *S. pilogyne*, *S. submodesta* and var. *procumbens*, *S. holotricha*, *S. Caroli*, *S. xiphophylla*, *S. amplifolia*, *S. echiioides*, *S. stirrolepida*, *S. vagans*, *S. phaeosepala*, *S. rupestris*, *S. buddleifolia*, *S. egregia*, *S. pannosa*, *S. achyrantha*, *S. Naumannii*, *S. oreadum* and var. *humilis*, and *S. Rudolphi*.—K. M. Wiegand.

911. DIELS, L. **Die Dipterocarpaceen von Papuasien.** [The Dipterocarpaceae of Papuaasia.] Bot. Jahrb. 57: 460-463. 1922.—This is No. 76 of Series VIII of the Beiträge zur Flora von Papuaasia. The few species known from this region are found at lower altitudes and are related to those of Celebes and the Philippines. This is probably a young element in the flora. Four genera and 10 species are listed. Of these species *Hopea papuana* is described as new, and 2 other new species are noted but without names. The genera included are *Anisoptera* Korth., *Hopea* Roxb., *Shorea* Roxb., and *Vatica* L.—K. M. Wiegand.

912. DIELS, L. **Die Bignoniaceen von Papuasien.** [The Bignoniaceae of Papuaasia.] Bot. Jahrb. 57: 496-500. Fig. 1. 1922.—This is No. 78 of Series VIII of the Beiträge zur Flora von Papuaasia. With the exception of 2 more widely distributed species the Bignoniaceae of Papuaasia are endemic. They are found both on the lowlands and highlands. The genera represented are *Tecomathe* Baill., *Pandorea* Spach., *Neosepicaea* Diels, and *Dolichandrone* Fenzl. The genus *Neosepicaea* is described as new. The following new species and combinations are proposed: *Tecomathe aurantiaca*, *T. montana*, *T. sarosa*, *Pandora stenantha*, ?*P. leptophylla* (*Tecoma leptophylla* Bl.), *Neosepicaea viticoides*.—K. M. Wiegand.

913. ENGLER, A. **Ein neuer Saxifragen-Bastard.** [A new hybrid in Saxifraga.] Bot. Jahrb. 57: Beibl. 127: 63. 1922.—The hybrid described is *Saxifraga cuneifolia* × *rotundifolia*, also named × *S. Mattfeldii* n. sp. It was collected by Mattfeld in Kärnten near Hermagor.—K. M. Wiegand.

914. ENGLER, A. **Saxifragaceae-Saxifraga (Pars generalis).** Pflanzenreich Heft 69 (IV. 117). p. 1-47, 4 fig. 1919.—The author presents a general introductory part to the monograph of *Saxifraga* in which he gives the most important literature pertaining to the genus, a detailed statement of the morphology, the geographical distribution, and the relationships within the family. In connection with the geographical distribution of the genus 3 great floral kingdoms are designated, namely, (1) Boreales Florenreich, (2) Palaëotropisches Florenreich, and (3) Zentral- und südamerikanisches Florenreich. These floral kingdoms are divided variously into territories, and the territories again into provinces. The species of *Saxifraga* most characteristic of the individual provinces are enumerated.—J. M. Greenman.

915. ENGLER, A., UND E. IRMSCHER. **Saxifragaceae-Saxifraga. II. Sectiones Trachyphyllum, Xanthizoon, Euaizoonia, Kabschia, Porphyrium, Tetrameridium, Diptera Spec. 234-302 et Additamentum.** Pflanzenreich Heft 69 (IV. 117. ii). p. 449-709, 84 fig. 1919.—The present, or 2nd, part of this monograph is concerned with an elaboration of the sections mentioned in the title and includes about 70 species, numerous varieties, forms, and hybrids. Several species, for example, *Saxifraga aspera* L., *S. aizoides* L., *S. bronchialis* L., *S. lingulata* Bell., *S. aizoon* Jacq., *S. porophylla* Bertol., and *S. oppositifolia* L. are designated as polymorphic types. These types, or species, are divided variously into subordinate categories, namely, subspecies, varieties, forms, hybrids, etc., which are described and exemplified by the citation of exsiccata, and their geographical distribution is given in considerable detail. A number of new varieties, combinations, and hybrids are recorded. The supplement contains

many additions and corrections for annotation in the 1st part of the monograph, which was issued in 1916. The new species, described here for the first time, are: *Saxifraga Stolitzkæ* Duthie, *S. subsessiliflora* Engl. & Irmsch., *S. kumaunensis* Engl., and *S. quadrifaria* Engl. & Irmsch., all indigenous to the Himalayan region.—*J. M. Greenman.*

916. HARMS, H. *Elne neue Art von Platymiscium (Leguminosae) aus Brasilien.* [A new species of *Platymiscium* from Brazil.] Bot. Jahrb. 57: Beibl. 127: 64. 1922.—The species described is *Platymiscium Zehntneri*.—*K. M. Wiegand.*

917. HITCHCOCK, A. S. *A perennial species of teosinte.* Jour. Washington [D. C.] Acad. Sci. 12: 205-208. 1922.—This first perennial species of teosinte, which was collected by the author in Mexico in 1910, differs from all other known species by the possession of rhizomes, and is described under the name *Euchlaena perennis*.—*Helen M. Gilkey.*

918. HUTCHINSON, J. *Rhododendron praeteritum n. sp.* Gard. Chron. 71: 149. Fig. 73. 1922.—The plant described was grown at Kew Garden and is related to *R. maculiferum* and *R. oreodora* Franch.—*P. L. Ricker.*

919. KILLIP, E. P. *New Passifloras from Mexico and Central America.* Jour. Washington [D. C.] Acad. Sci. 12: 255-262. 1922.—Eleven new species are described under the following names: *Passiflora apetala*, *P. fruticosa*, *P. Cookii*, *P. costaricensis*, *P. Heydei*, *P. panamensis*, *P. Rovirosae*, *P. talamancensis*, *P. platyloba*, *P. Purpusii*, *P. Williamsii*. The variety known as *P. foetida arida* Mast. & Rose, has been raised to specific rank under the name *P. arida*.—*Helen M. Gilkey.*

920. KRAUSE, K. *Die Lorantheaceen Papuasien.* [The Lorantheaceae of Papuaia.] Bot. Jahrb. 57: 464-495. Fig. 1-4. 1922.—This is No. 77 of Series VIII of the Beiträge zur Flora von Papuaia. The previously known species of Lorantheaceae from this region have been increased from 24 to 57, distributed among 5 genera namely: *Elytranthe* Blume, *Loranthus* L., *Phrygilanthus* Eichl., *Notothizos* Oliv., and *Viscum* L. The majority of species are endemic. Plants of this family inhabit the various altitudinal zones, though certain genera or sections are characteristically lowland or alpine. Certain species are notable because of their creeping or twining habit about the host, a feature found also among certain Indian, Malayan, and American species. The following species and combinations are proposed as new: *Elytranthe macropoda*, *E. Versteegii* (*Loranthus Versteegii* Lauterb.), *E. pallidiflora*, *E. leucantha*, *E. Peckelii*, *E. Schlechteri*, *E. longifolia*, *E. neurophylla*, *E. acutifolia*, *E. Ledermannii*, *E. torulosa*, *E. verrucosa*, *E. spathulifolia*, *E. diversifolia*, *Loranthus kaniensis*, *L. djamuensis*, *L. Schultzei*, *L. basiflorus*, *L. obtusus*, *L. rigidiflorus*, *L. Thespesiae*, *L. tenuisepalus*, *L. Wichmannii*, *L. iboensis*, *L. articulatus*, *L. squarrosus*, *L. verticillifolius*, *L. miclostomatifolius*, *L. molliflorus*, *L. spathatus*, *L. curvifolius*, *L. heterochromus*, *Phrygilanthus noro-guineensis*, *Notothizos spicatus*, *N. Schlechteri*, and *N. Ledermannii*.—*K. M. Wiegand.*

921. LAUTERBACH, C. *Die Lecythydaceen Papuasien.* [The Lecythydaceae of Papuaia.] Bot. Jahrb. 57: 341-353. Fig. 1-4. 1922.—This is No. 70 of Series VIII of the Beiträge zur Flora von Papuaia. Of this family 3 genera and 21 species are found in this region of which 15 species are endemic. Some are showy trees of the coastal forests. *Barringtonia speciosa* L., *B. Schuchardiana* K. Schum., and *B. Norae-Hiberniae* Laut. produce edible seed. With 2 exceptions the Lecythydaceae inhabit the lowlands. Twenty-five per cent of the endemic species are found only on New Pommern and New Mecklenburg. Keys to the genera and species are given. The genera treated are: *Planchonia* Bl., *Careya* Roxb., and *Barringtonia* Forst. The following species are described as new: *Barringtonia papch* and *B. quadrigibbosa*, Bismark Archipelago; *B. pauciflora*, *B. apiculata*, and *B. sepikensis*, northeastern New Guinea. A new variety, *B. calyptrocalyx* K. Schum. var. *mollis*, is proposed.—*K. M. Wiegand.*

922. LAUTERBACH, C. *Die Rhamnaceen Papuasien.* [The Rhamnaceae of Papuaia.] Bot. Jahrb. 57: 326-340. Fig. 1-3. 1922.—This is No. 69 of Series VIII of the Beiträge zur

Flora von Papuasien. Eight genera and 13 species are known from this region. Many species are found in the coastal swamps and along the river banks. A large number of lianes occur. The genera included are: *Ventilago* Gaertn., *Smythea* Seem., *Zizyphus* Juss., *Dallachya* F. v. M., *Rhamnus* L., *Colubrina* L. C. Rich., *Alphitonia* Reiss, and *Gouania* Jacq. Keys are given to the genera and species treated, and the following new species are proposed: *Smythea macrophylla*, *Zizyphus papuanus*, *Z. djamuensis*, *Rhamnus nigrescens*, *R. papuanus*, and *R. Schlechteri*, northeast New Guinea; *R. sumbawanus*, Sumbawa. New varieties are: *Gouania microcarpa* DC. vars. *papuana*, *novo-hibernica*, *rugulosa*, and *mollis*. A key to the species and varieties of *Gouania* found in the monsoon region is given, and also a discussion of this genus.—K. M. Wiegand.

923. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. VI, Part 2. p. 61-106, pl. 212-215. William Applegate Gullick: Sydney, April, 1922.—This part introduces a chapter on Hybridization in the Genus; it is followed by descriptions and illustrations of the following hybrids: \times *Eucalyptus algeriensis* Trabut, *E. amplifolia* Naudin, \times *E. antipolitensis* Trabut, \times *E. Bourlieri* Trabut, \times *E. Cordieri* Trabut, \times *E. gomphocornuta* Trabut, \times *E. jugalis* Naudin, *E. occidentalis* Endl. var. *oranensis* Trabut n. var., \times *E. pseudo-globulus* (Hort.) Naudin, \times *E. Trabuti* Vilmorin, *E. Stuartiana* \times *globulus* Trabut, and \times *E. insizwaensis* Maiden n. sp. The chapter on Bark which was begun in the previous volume of this work is continued in the present part. IND. Part 3. p. 107-164, pl. 216-219, May, 1922.—This part is concerned primarily with natural hybrids of which the following (except *Blackburniana*) are described and illustrated, as new: \times *Eucalyptus barmedmanensis*, \times *E. tenandensis*, \times *E. Peacockeana*, \times *E. Stopfordi*, \times *E. Forsythii*, \times *E. auburnensis*, \times *E. yagobieii*, \times *E. Blackburniana*, and *E. studleyensis*. Miscellaneous notes on hybrids are added, and under the caption of Timber a discussion is given of the various *Eucalyptus* woods.—J. M. Greenman.

924. MAIRE, RENÉ. Les *Adenocarpus* de l'Afrique du Nord. [The members of the genus *Adenocarpus* of North Africa.] Bull. Sta. Recherches Forest. Nord Afrique 1: 211-217. Pl. 22-23. 1921.—North Africa is especially rich in *Adenocarpus*, containing 11 of the 18 known species. Of these, 7 are found in Morocco and 4 in Algeria. A list of these 11 species, with the localities of their occurrence, is given. Technical notes are recorded in Latin for a little known species, *A. umbellatus* Coss. & Dur. Two new species are described, *A. Faurei* and *A. Boudyi* Batt. & Maire. A key to the North African species is also included.—J. Kittredge, Jr.

925. MATTFELD, JOH. Beitrag zur Kenntniss der systematischen Gliederung und geographischen Verbreitung der Gattung *Minuartia*. [Contribution to the knowledge of the systematic subdivision and geographical distribution of the genus *Minuartia*.] Bot. Jahrb. 57: Beibl. 127: 13-63. 1922.—The genus as here understood includes *Arenaria*, *Cherleria* L., *Queria* L., *Honckenya* Ehrh., *Rhodalsine* Gay, *Greniera* Gay, *Sieberta* Schrad., and *Hymenella* Moc. & Sess. The paper consists of 2 chapters, of which the 1st deals with the relationship of genera in the *Alsinoideae* and the 2nd with the subdivision of the genus into sections and groups, with consideration of their geographical distribution. In the former it is noted that the genera with a 5-carpetted gynoeceum are relatively primitive. The reduction to 4 carpels occurs readily in diverse groups, while the 3-carpetted gynoeceum is more distinct and more fundamental. The author notes Fernald's discussion of the unity of the genus *Arenaria*. The 2nd chapter is subdivided as follows: (1) Limits of the genus. (2) Historical account of the attempts at classification. (3) Account of the essential characteristics: a. germination and cotyledons; b. growth forms and inflorescence of annuals; c. growth forms and inflorescence of perennials; d. anatomy of the stem and the trichomes; e. foliage; f. calyx and sepals; g. corolla; h. androeceum and staminal glands; i. gynoeceum; j. seeds; k. dielism. (4) Division of the genus into sections and groups. Seventeen sections are proposed and discussed, and a key to these is given. The center of distribution of the genus is Europe with many species in North America, while the genus is almost unrepresented in eastern Asia, Africa, and South America. *Minuartia Engleri* and *M. Wettsteinii*, both of southern Europe, are described as new.—K. M. Wiegand.

926. PAX, F., UND KÄTHE HOFFMANN. Euphorbiaceae-Acalyphaceae-Plukenetinae. Euphorbiaceae-Acalyphaceae-Epiprininae. Euphorbiaceae-Acalyphaceae-Riciniaceae. Pflanzenreich Heft 68 (IV. 147, ix-xi). 134 p., 29 fig. 1919.—This paper concerns 19 genera, of which *Tragia* with 126 species is by far the largest. A few new genera are proposed; certain sections of Müller are raised to generic rank, several new species are described, and new combinations made. These are: *Eleutherostigma* n. gen. with 1 species, *E. Lehmannianum*, from Colombia; *Angostyliidium* (*Plukenetia* Sect. *Angostyliidium* Müll. Arg.) n. gen., *A. conophorum* (*Plukenetia conophora* Müll. Arg.); *Apodandra* n. gen. from Peru and Bolivia, *A. loretensis* (*Plukenetia lorentensis* Ule), *A. Buchtienii* (*Plukenetia Buchtienii* Pax); *Pterococcus corniculatus* (*Plukenetia corniculata* Sm.), *P. africanus* (*Plukenetia africana* Sond.), *P. procumbens* (*Plukenetia procumbens* Prain); *Anabaenella* (*Anabaena* Juss., not Rehb.) n. gen., *A. tamnoides* (*A. tamnoides* Juss.), *A. tamnoides* vars. *genuina* and *sinuata* (*Plukenetia sinuata* Ule); *Haematostemon* (*Astrococcus* Sect. *Haematostemon* Müll. Arg.) n. gen., *H. coriaceus* (*Astrococcus coriaceus* Baill.); *Tragia leucandra* (*Leucandra betonicifolia* Klotzsch), *T. fallacina*, *T. caperonioides*, *T. catamarcensis*, *T. Emilii*, *T. volubilis* L. vars. *longifolia* and *pedicellaris* (*T. pedicellaris* Müll. Arg.), *T. amblyodonta* (*T. nepetifolia* var. *amblyodonta* Müll. Arg.), *T. tenella*, *T. aliena*, *T. paraguayensis* and vars. *canescens*, *macrophylla* (*T. uberabana* var. *macrophylla* Chod. & Hass.), *subsessilis* (*T. bahiensis* var. *subsessilis* Chod. & Hass.), *discolor* (*T. uberabana* var. *discolor* Chod. & Hass.), and *glabrescens*, *T. microcarpa*, *T. pseudomelochioides*, *T. adenophila* and vars. *mollis*, *ferruginea*, and *glanduligera*, *T. depauperata*, *T. urens* L. var. *innocua* (*T. innocua* Walt.), *T. Hieronymi*, *T. Karsteniana*, *T. Stolziana*, *T. pungens* (Forsk.) Müll. Arg. vars. *genuina* Pax & Hoffm. and *cinerea* Pax, *T. Mülleriana* vars. *cordata* and *unicolor* (Müll. Arg.), *T. cannabina* L. f. vars. *hastata* (L.) and *Hildebrandtii* (Müll. Arg.), *T. lasiophylla*, *T. dioica* Sond. vars. *lobata* (Müll. Arg.) and *Schinzi* Pax, *T. lancifolia* Dinter, *T. glabrata* (*T. Meyeriana* var. *glabrata* Müll. Arg.), *T. furialis* Bojer vars. *eufurialis* (*T. furialis* Prain) and *Scheffleri* (*T. Scheffleri* Bak.). *T. Milbraediana*; *Tragiella* n. gen. of African plants, *T. natalensis* (*Tragia natalensis* Sond.), *T. anomala* (*Tragia anomala* Prain), *T. Friesiana* (*Tragia Friesiana* Prain); *Sphaerostylis malaccensis* (*Megistostigma malaccense* Hook. f.), and *Pachystylidium* n. gen. from Java and the Philippines, represented by *P. hirsutum* (*Tragia hirsuta* Blume) vars. *genuina* and *irritans* (*Tragia irritans* Merrill); *Epiprinus malayanus* Griff. vars. *genuinus* and *Balansae*; *Ricinus communis* L. var. *inermis* (*R. inermis* Jacq.).—J. M. Greenman.

927. PAX, F., UND KÄTHE HOFFMANN. Euphorbiaceae-Additamentum VI. Pflanzenreich Heft 68 (IV. 147, xiv). 81 p. 1919.—In the present supplement the authors give a brief discussion of the relationship and natural sequence of the first 10 tribes of the Euphorbiaceae, followed by a dichotomous key to the tribes, subtribes, and the 198 recognized genera. Numerous additions are recorded for insertion in previously published parts of the monograph of this family. Several plants new to science are described, mostly from Australasia and Brazil; a list of collectors and specimens cited is also given. The new genera, species, varieties, and combinations included are as follows: *Caperonia similis*, *Annesijoa* n. gen. from New Guinea, *A. novoguineensis*, *Mareya spicata* Baill. var. *micrantha* (*Acalypha micrantha* Benth.), *Mareyopsis longifolia* (*Mareya longifolia* Pax), *Clarorivinia grandifolia*, *Blumeodendron borneense*, *B. papuanum*, *Claoxylon lutescens*, *C. glabrifolium* Miq. var. *integrifolium*, *C. Warburgianum*, *C. carolinianum*, *Mallotus batjanensis*, *M. sanguirensis*, *M. Warburgianus*, *M. papuanus* (J. J. Smith) Pax & Hoffm. vars. *genuinus*, *intermedius*, and *glabrescens*, *Alchornea brachygyne*, *Cleidion Minahassae*, *C. membranaceum*, *Macaranga parvibracteata*, *M. pleiostemona*, *M. haplostachya*, *M. polyadenia*, *M. lanceolata*, *M. effusa*, *M. penninervia*, *M. crassispulosa*, *M. mallotiformis*, *M. villosula*, *M. acuminata*, *M. brunneofloccosa*, *M. carolinensis* Volkens var. *grandifolia*, *M. ovalifolia*, *M. pseudopeltata*, *M. similis*, *M. caudata*, *M. platyclada*, *M. strigosa*, *M. fallacina*, *M. advena*, *M. gracilis*, *Jatropha brevifolia* (J. gossypifolia var. *brevifolia* Morong), *Clutya heterophylla* Thunb. var. *disceptata* (C. *disceptata* Prain), *Pausandra quadriglandulosa*, *Cumuria Uleana*, *Neoscortechinia arborea* (*Alcinacanthus arboreus* Pax & Hoffm.) and var. *parvifolia* (A. *parvifolius* Merrill), *N. Kingii* (*Scortechinia Kingii* Hook. f.), *N. nicobarica* (S. *nicobarica* Hook. f.), *Neomphalea papuana* (*Omphalea papuana*

Pax & Hoffm., *Senefeldera triandra*, *Mabea anadena*, *M. atroviridis*, *M. depauperata*, *M. sub-sessilis* (*M. anomala* Glaziovii), *M. Uleana*, *Homalanthus polyadenius*, *Actinostemon depauperatus*, *A. Glaziovii* (*A. grandifolius* Glaziovii), and *Sapium Türckheimianum*.—J. M. Greenman.

928. PAX, F., UND KÄTHE HOFFMANN. **Euphorbiaceae-Dalechampiae.** Pflanzenreich Heft 68 (IV. 147, xii). 59 p., 9 fig. 1919.—The genus *Dalechampia* is held by the authors to represent a distinct tribe of the Euphorbiaceae, allied to other members of this family through *Plukenetia* and *Tragia*. The group embraces 88 species, distributed mainly in the American tropics. The following new species, varieties, names, and combinations are included: *Dalechampia panamensis*, *D. madagascariensis* (*D. ternata* var. *madagascariensis* Müll. Arg.), *D. Weberbaueri*, *D. pallida* Klotzsch, *D. micromeria* Baill. vars. *genuina* and *angustifolia*, *D. Bangii*, *D. anomala*, *D. heteromorpha*, *D. stipulacea* Müll. Arg. var. *bogotensis*, *D. Martiana* Klotzsch, *D. Karsteniana*, *D. Uleana*, *D. bidentata* Blume vars. *genuina* and *yunnanensis*, *D. scandens* L. vars. *pernambucensis* (*D. pernambucensis* Baill.), *pseudoclematidis* (*D. pseudoclematidis* Baill.), *Hildebrandtii* Pax (*D. Hildebrandtii* Pax), and *natalensis* (*D. natalensis* Müll. Arg.), *D. Hersogiana*, *D. linearis* Baill. var. *goyazensis* (*D. goyazensis* Müll. Arg.), *D. morifolia*, *D. amambayensis*, *D. rubriventia*, *D. trichophila*, *D. serrula*, *D. Schenckiana*, *D. boliviana*, *D. tenuiramea* Müll. Arg. vars. *genuina* and *cynanchoides* (*D. cynanchoides* Moore), *D. ulmifolia* Chod. & Hassl. vars. *genuina* and *Grüningiana* Pax (*D. Grüningiana* Pax), and *D. parvula*.—J. M. Greenman.

929. PAX, F., UND KÄTHE HOFFMANN. **Euphorbiaceae-Perae.** Pflanzenreich Heft 68 (IV. 147, xiii). 14 p., 2 fig. 1919.—The authors interpret *Pera* as representing a distinct tribe of the Euphorbiaceae, and recognize about 20 species all of which are trees or shrubs occurring in the American tropics. One new species is described and 1 new combination made, namely, *Pera Glaziovii* Taubert and *P. barbinervis* (*Spixia barbinervis* Mart.).—J. M. Greenman.

930. PITTIER, H. On the species of *Dalbergia* of Mexico and Central America. Jour. Washington [D. C.] Acad. Sci. 12: 54-64. 1922.—Eight new species, as follows, are described: *Dalbergia melanocardium*, *D. congestiflora*, *D. tabascana*, *D. cibix*, *D. mexicana*, *D. hypoleuca*, *D. granadillo*, and *D. lineata*. *D. cubilquitzensis* (Donn. Smith) Pittier is added, and a key for all the known species of the region is published. In addition to the new species, the following are included in the key: *D. tucurensis* Donn. Smith, *D. glomerata* Hemsl., *D. campechana* Benth., *D. Brownei* (Jacq.) Urban, *D. ecastophyllum* (L.) Taub., *D. monetaria* L., *D. calycina* Benth., *D. retusa* Hemsl.—Helen M. Gilkey.

931. ROSENTHAL, KÄTHE. **Daphniphyllaceae.** Pflanzenreich Heft 68 (IV. 147a). 16 p., 1 fig. 1919.—The author reinstates the family Daphniphyllaceae, as distinct from the Euphorbiaceae, and refers to it the single genus *Daphniphyllum* which comprises 24 known species, endemic in southeastern Asia. The following new species, combinations, and varieties are included: *Daphniphyllum celebensis*, *D. nilgherrense* (*Gouphia nilgherrensis* Wight) and var. *concolor* (*D. glaucescens* var. *concolor* Müll. Arg.), *D. Oldhamii* (*D. glaucescens* var. *Oldhami* Hemsl.), *D. macropodium* Miq. var. *humile* (*D. humile* Maxim.), *D. bengalense*, *D. chartaceum*, *D. latifolium*, *D. Parianum*, *D. longeracemosum*, and *D. gracile*.—J. M. Greenman.

932. TRELEASE, WILLIAM. The peltate peperomias of North America. Bot. Gaz. 73: 133-147. Pl. 1-4. 1922.—An historical account of the taxonomy of the peltate peperomias is given together with a synopsis of the group. The latter presents the species in 8 subgenera which are arranged in 4 groups. The following new species appear: *Peperomia Painteri*, *P. astyla*, *P. Parryana*, *P. tenuimucronata*, *P. schizandra*, *P. amphoricarpa*, *P. schizostachya*, *P. Killipi*, *P. cordulatiformis*, *P. peltolimba*.—B. W. Wells.